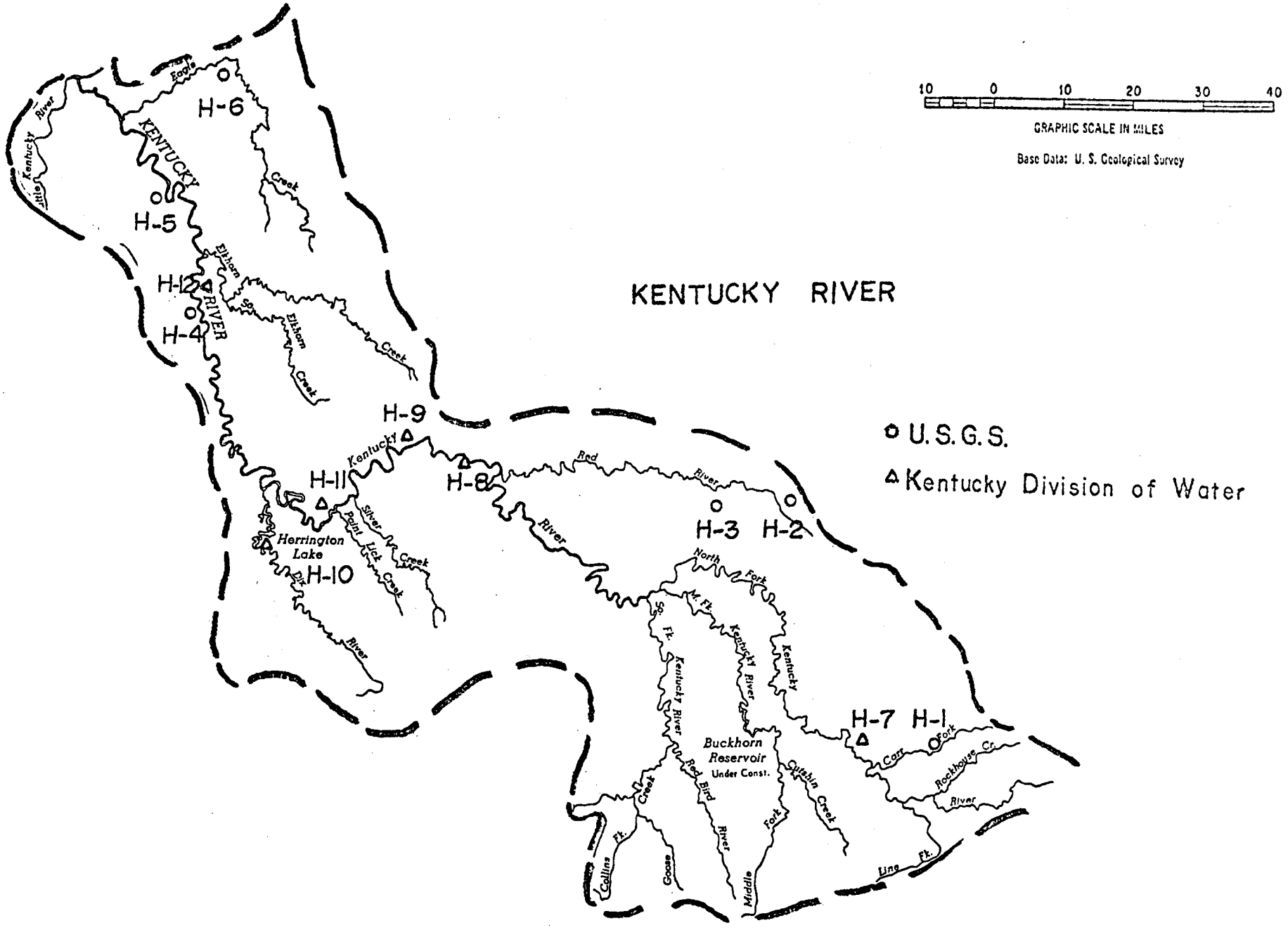

KENTUCKY RIVER
10 0 10 20 30 40
GRAPHIC SCALE IN MILES
Base Data: U. S. Geological Survey
U.S.G.S.
Kentucky Division of Water
H-1
H-2
H-3
H-4
H-5
H-6
H-7
H-8
H-9
H-10
H-11
H-12
Little Eagle
Kentucky River
Eagle Creek
Elkhorn Creek
Herrington Lake
Dix River
Silver Lick Creek
Red River
North Fork
Middle Fk.
South Fk.
Kentucky River
Buckhorn Reservoir
Under Const.
Carr Fork
Rockhouse Cr.
Cutshin Creek
Red Bird River
Goose Creek
Collins Fk.
Middle Fork
Line Fk.

THE KENTUCKY RIVER BASIN

This report is basically divided into two main sections, the first section being a description of the basin and the second section dealing with the quality of the water in the basin.

The first section is entitled "Basin Description" and describes the geography, topography, geology, hydrology and population characteristics within the Kentucky River Basin.

The second section of the report is entitled "Basin Water Quality" and describes the quality of the water with respect to general chemical, trace chemical, waste load effects, non-point source effects, uses, and changes.

I. A Description of the Kentucky River Basin

A. Geography

In an effort to better describe the Kentucky River Basin it will be divided into two sections. The first section (hereinafter referred to as the "Headwater Section") begins at the headwaters and ends at the City of Irvine and includes the three major forks of the river and 37 miles of its main stem. The remainder of the basin (hereinafter referred to as the "Bluegrass Section") will further be divided into inner and outer sections. The main stem of the Kentucky River is 255.5 miles long from it's mouth to the confluence of the North, Middle and South Forks.

The Kentucky River Basin lies wholly within the State of Kentucky and the river flows in a northwesterly direction. It begins in southeastern Kentucky, flows through the central part of the state and empties into the Ohio River at mile point 435.6 in North Central Kentucky.

The total area of the basin is 7,033 sq. mi. and contains eight sub-basins with areas of over two hundred sq. mi.. (See Table H-1) The basin contains, either wholly or partially, 36 of the 120 counties in the State. (See Table H-2)

B. Topography

The Headwater Section is a mountainous area and is heavily mined for coal. Therefore, the water has a considerable sulfate content and is slightly acidic in the immediate coal mining areas. The average slope of the tributaries in this section ranges from 3 ft./mi. to 7.2 ft./mi. which are moderate slopes and it can therefore be said that the waste load assimulation capacity of the tributaries in this section is moderate. The average slope of the main stem of the river in this section is approximately 0.9 ft./mi. which is a low slope for reaeration.

The maximum elevations of the tributaries in this section range from 760 feet to 1,250 feet mean sea level (m.s.l.). It should be noted that water will hold about 2 per cent less dissolved oxygen for every 500 feet in elevation above sea level. Therefore, the dissolved oxygen capacity of these streams is retarded by approximately 4 per cent.

The Bluegrass Section lies in north-central Kentucky and is a structurally high but physiographically level area. The average slope of the tributaries in this section ranges from approximately 3 feet per mile to 32 feet per mile which are moderate to high and it can therefore be said that the waste load assimilation capacity of the tributaries in this section are moderate to high. The average slope of the main stem of the river in this section is approximately 0.7 ft./mi.

The maximum elevations of the tributaries in this section range from 710 feet to 950 feet m.s.l. and therefore the dissolved oxygen capacity of these streams is retarded by approximately 3 per cent. (For more detailed

information regarding slopes and elevations see Table H-3)

C. Geology

For the purposes of this report the most significant geological feature in the Headwater Section is the coal resources. Due to the mining activities including the stripping, washing, and loading of coal, there is a great amount of exposed coal in this area. The runoff is rapid and carries a considerable amount of solids to the streams. There are also thin beds of limestone in this area which contribute to the hardness of the water. Because of greater relief and the resulting more rapid runoff of surface water and drainage of groundwater from exposed strata, groundwater is not available in adequate amounts for water supply. Groundwater supplies diminish in dry weather owing to the paucity of groundwater storage.

The Bluegrass Section can be divided into inner and outer sections with regards to geology, the inner bluegrass being underlain by thick, pure limestone and the outer bluegrass by outward dipping thin beds of limestone and shale. The limestone of the inner bluegrass, though thick and soluble, contains shaly zones which are important because they limit the circulation of water and the development of permeable zones. In the outer bluegrass the conditions are even less favorable because the limestone beds are thinner and there is more inner bedded shale. Limestone that underlies shale will rarely yield much water except near streams that have cut through the shale. The only wells in bedrock that produce more than 100 gallons per minute are in thick limestone in the inner bluegrass. Nearly all successful wells in bedrock are less than 100 feet deep. In the bluegrass region as a whole the groundwater is hard to very hard. About one-eighth of the existing wells are reported to yield water containing excessive sodium and chloride, and about one-fifth yield water containing

noticeable amounts of hydrogen sulfide.

D. Hydrology

The Kentucky River has fourteen dams (See Table H-8) in it which restrict the flow and cause a decrease in reaeration rates, therefore causing the dissolved oxygen content to be reduced when an organic load is imposed on the stream. Furthermore, the slow moving water allows suspended solids to settle causing sludge deposits which impose a demand on dissolved oxygen and can hamper navigation unless removed.

There are two water withdrawals in the basin that are significant to water quality. The City of Lexington withdraws from the Kentucky River but discharges to tributaries which enter the river below Lock 8, and the City of Winchester withdraws from the Kentucky River but discharges to another basin. The City of Winchester withdraws approximately 1.5 MGD and the City of Lexington withdraws approximately 28 MGD. These two withdrawals are not put back in the river above Lock 8 near Frankfort and therefore reduce the once in seven day, ten year low flow at the Lock by the total 29,500,000 gallons per day or approximately by 20 per cent. This reduced low flow can affect the waste load allocation and subsequent treatment levels required for the cities of Richmond and Berea.

The City of Lawrenceburg also withdraws from the Kentucky River and discharges into another basin but this withdrawal has no significant impact on water quality.

The average normal flow of the Kentucky River at Locks 14, 10, and 4 are 3,369 cubic feet per second, 5,279 cubic feet per second, and 7,199 cubic feet per second respectively. The average yield of the basin is 1.3 cubic feet per second per square mile throughout the main stem of the river. Table H-4 expands on the flow records.

TABLE H- 4

SURFACE WATER RECORDS FOR THE KENTUCKY RIVER BASIN

STATION	PERIOD OF RECORD	DRAINAGE AREA	AVERAGE FLOW	MAXIMUM FLOW	MINIMUM FLOW	7-day/10 yr. LOW FLOW
N. Fork of KY. River at Hazard	35 yrs.	466 sq.mi.	585 cfs, 1.3cfs/sq.mi.*	47,800 cfs, 103cfs/sq.mi.	Not determined	93 cfs
	wtr/yr 1975		1,042 cfs, 2.2 cfs/sq.mi.	21,500 cfs, 46cfs/sq.mi.	8.7 cfs, 0.0cfs/sq.mi.	
Lock 14 near Heidelberg **	43 yr.	2,657 sq.mi.	3,369 cfs, 1.3cfs/sq.mi.	120,000 cfs, 45cfs/sq.mi.	4.0 cfs, 0.0cfs/sq.mi.	120 cfs
	wtr/yr 1975		6,007 cfs, 2.3cfs/sq.mi.	80,600 cfs, 30cfs/sq.mi.	199 cfs, 0.1cfs/sq.mi.	
Lock 10 near Wincester **	68 yr.	3,955 sq.mi.	5,279 cfs, 1.3cfs/sq.mi.	92,400 cfs, 23cfs/sq.mi.	10 cfs, 0.0cfs/sq.mi.	160 cfs
	wtr/yr 1975		8,382 cfs, 2.1cfs/sq.mi.	71,500 cfs, 18cfs/sq.mi.	175 cfs, 0.0cfs/sq.mi.	
Lock 4 near Frankfort ***	50 yr.	5,412 sq.mi.	7,199 cfs, 1.3cfs/sq.mi.	115,000 cfs, 21cfs/sq.mi.	Not determined	270 cfs
	wtr/yr 1975		10,890 cfs, 2.0cfs/sq.mi.	77,700 cfs, 14cfs/sq.mi.	359 cfs, 0.1cfs/sq.mi.	

TABLE H-4
Continued

STATION	PERIOD OF RECORD	DRAINAGE AREA	AVERAGE FLOW	MAXIMUM FLOW	MINIMUM FLOW	7-day/10-yr. LOW FLOW
Elkhorn Creek near Frankfort	38 yr.	473 sq.mi.	612 cfs, 1.3cfs/sq.mi.	23,200 cfs, 49cfs/sq.mi.	0 cfs	28 cfs****
	wtr/yr 1975		935 cfs, 2.0cfs/sq.mi.	12,300 cfs, 26cfs/sq.mi.	44 cfs, 0.1cfs/sq.mi.	

* Cubic feet per second

** Flow regulated by Buckhorn Lake beginning December, 1960.

*** Flow regulated by Buckhorn Lake since December, 1960, By Herrington Lake since November, 1925, and by a Hydroelectric plant at Lock 7.

**** Low flow contribution from main Lexington Town Branch Plant, 18 MGD (28 cfs).

NOTE: Data is taken from "Surface Water Records in Kentucky" by the United States Geological Survey. The 7-day/10-yr. low flow was taken from the waste load allocation produced as a component of the 303e River Basin Continuing Planning Process.

There are fifteen lakes (See Table H-5) located in this basin with a total combined volume of 286,000 acre feet and a total combined surface are of 6,530 acres. The only lakes considered in the Kentucky basin report are those whose volume is greater than 1,000 acre feet or have a surface area greater than 100 acres. Two of these lakes, Buckhorn Lake and Carr Fork Lake, are Federal installations with a combined volume of 28,000 acre feet. The Buckhorn Lake (22,000 acre feet) is regulated to meet flood, recreation, fish and wildlife and low flow augmentation objectives. The low flow augmentation objective aides the stream below the lake during periods of low flow by means of dilution and reaeration. The Carr Fork Lake (6,000 acre feet) has not been in operation long enough to determine its effects upon the stream below it.

E. Population

The total population in the basin is 534,400 with the rural population being 291,200 or 55 per cent of the total population. There are forty-two incorporated cities in the basin representing the remaining 243,200 people. The major concentration of population is in the inner bluegrass region in the adjoining counties of Fayette, Madison, Franklin, Scott and Woodford. These five counties represent 283,900 people or 53 per cent of the total population in the basin. (See Table H-6)

II. Basin Water Quality

A. Description of Sampling Stations

The water quality data presented in the next two sections of this report was collected at six sampling station. Three of these station are located on the main stem of the river at Lock 2 near Lockport, at Lock 4 near Frankfort and at the Lexington water treatment plant near I-75 in southern Fayette County. The other three stations are located on major tributaries thusly: North Fork of the Kentucky River at Hazard having 466 square miles above it, the station on the Red River having 180 square miles above it, the station on the main stem at Lexington having 4,015 square miles above it, the station on Eagle Creek at Flencoe having 430 square miles above it, and the station on the main stem at Lock 4 having 5,412 square miles above it. The summary of the raw water quality data is in Table H-9.

The station on the North Fork at Hazard was purposely chosen to represent water quality data in a coal mining area. The other four stations are more indicative of the general water quality in the Kentucky River Basin.

B. General Chemical Water Quality

The Chemcial composition of water is best defined by grouping dissolved elements which compose the total dissolved solids, by examining the relationships of groups of chemicals, the type of water whether hard or soft, slaty, acid or high in sulfates reflects the mix of surface and groundwater. The chemical characteristics of a stream when viewed over a long period of time is primarily from surface water. The type of rock formation and soils which the surface water contacts causes this predominate chemical characteristics. The

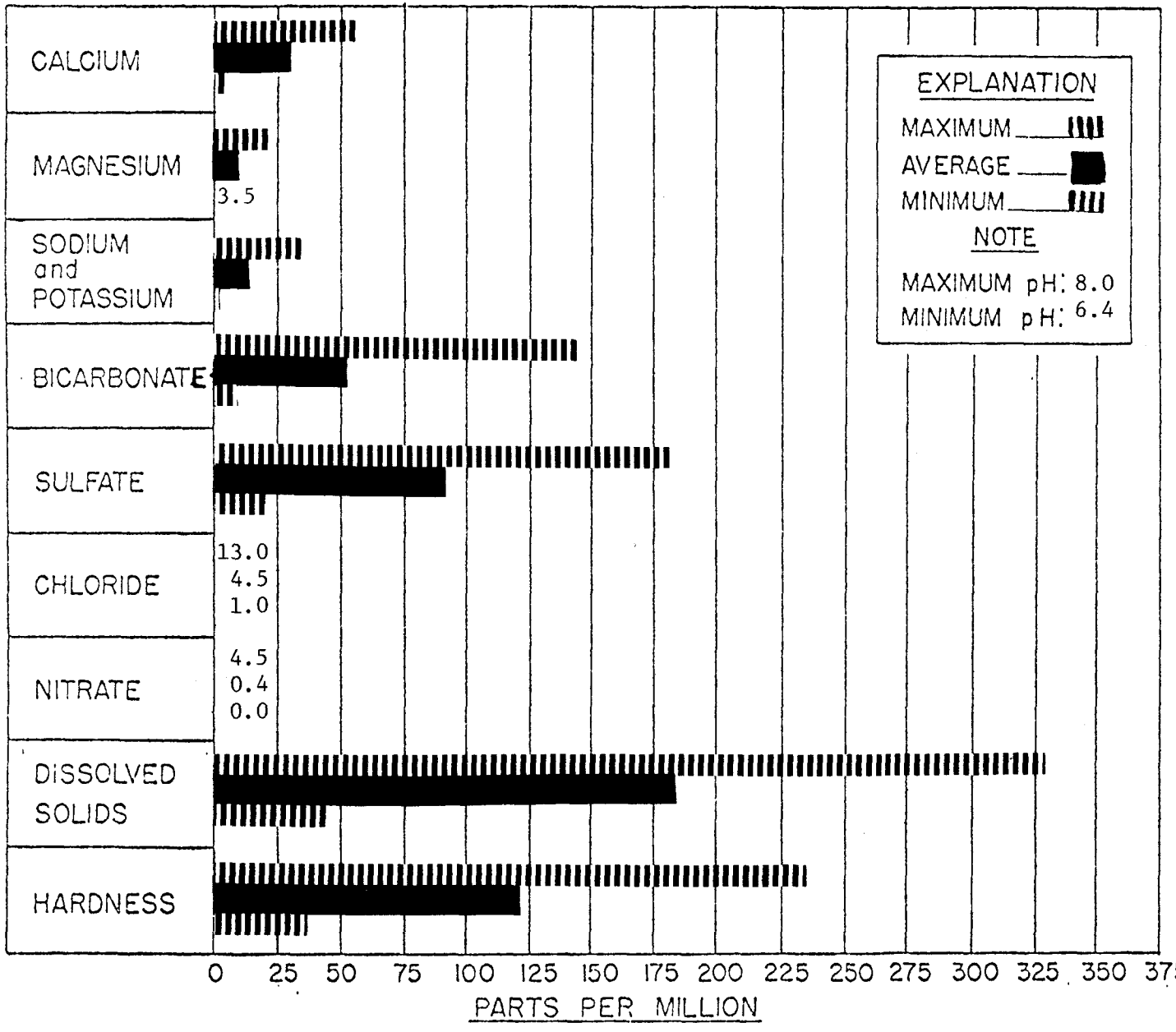
contribution of groundwater, whcih is generally higher in dissolved solids than surface water, can be shown by selecting the low flow period for data analyses. The general character of waters in Kentucky is one of moderate hardness caused by calcium and magnesium salts. The influence of mining activities are clearly indicatedwhen the slufate content increases to a higher level than the bicarbonate content, and the pH is on the acid side, below pH 5.5.

Oil field operations, when brine is encountered, are reflected by changes in sodium and chloride contents of the water. For Kentucky water, the influence is pronounced when either chloride or sodium exceeds 20 - 25 parts per million as an average value.

The overall water quality for the Kentucky River Basin is represented by the stations at Lock 4 near Frankfort, Red River at Pine Ridge, and Eagle Creek at Glencoe and Red River at Pine Ridge and both demonstrate the water quality for a sensitive stream. This means that water quality parameters have a wide range with respect to the average value.

Reference is made to Figures H-10, H-11 and H-12 which represent data for Eagle Creek at Glencoe for the period of 1-75 to 11-75, 2-73 to 11-74, and 1-62 to 11-74, respectively. Water Quality at Eagle Creek at Glencoe indicates that the water is very hard meaning that the calcium carbonate hardness is greater than 180 mg/l. Water in this sub-basin tends to be periodically acidic. The data indicates that the bicarbonate alkalinity is high providing a good inorganic load buffering capacity in this particular stream. The overall water quality in this sub-basin is good.

Relative to the Eagle Creek Basin, the water quality in the Red River at Pine Ridge has a higher quality as demonstrated by Figures H-4 and H-5. This is indicated by water characterized as soft (calcium carbonate hardness



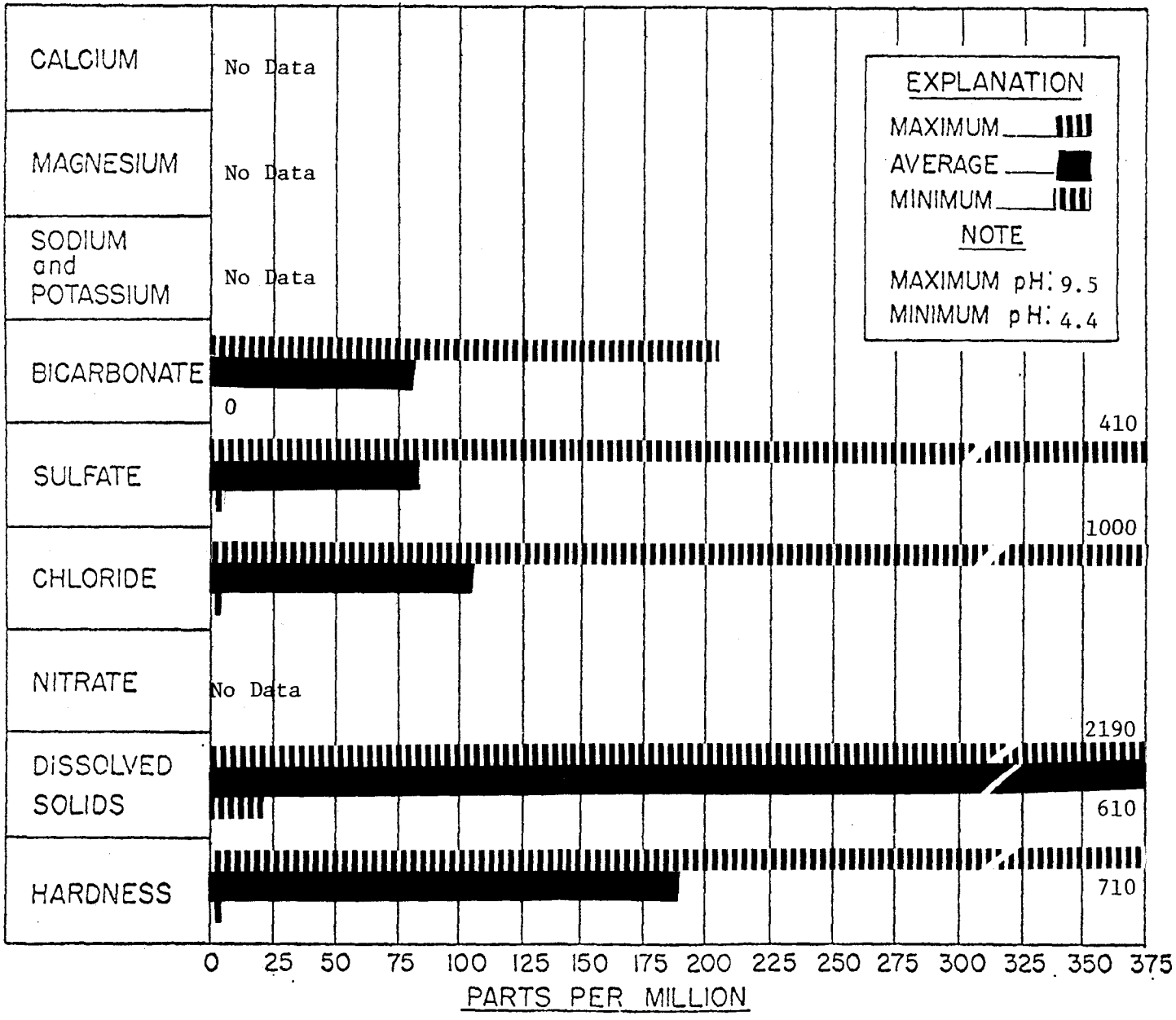
MAXIMUM, AVERAGE, and MINIMUM concentrations of dissolved constituents

FIGURE H-1

Carr Fork

Sassafras

7-70 to 12-74



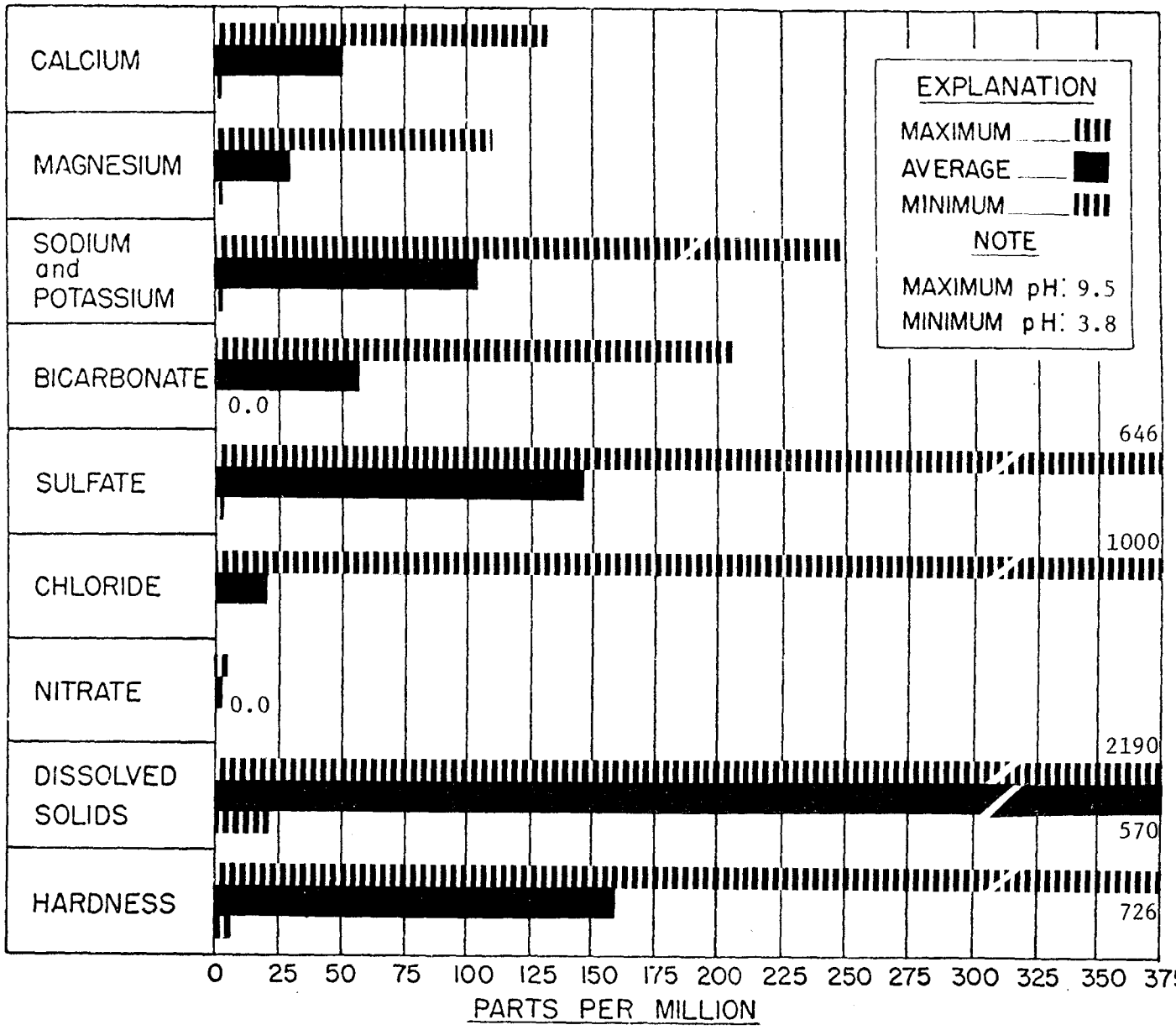
MAXIMUM, AVERAGE, and MINIMUM concentrations of dissolved constituents

FIGURE H-2

North Fork Kentucky River

Hazard

1-73 to 6-74



MAXIMUM, AVERAGE, and MINIMUM concentrations of dissolved constituents,

FIGURE H-3

North Fork Kentu River

Hazard

10-62 to 6-74

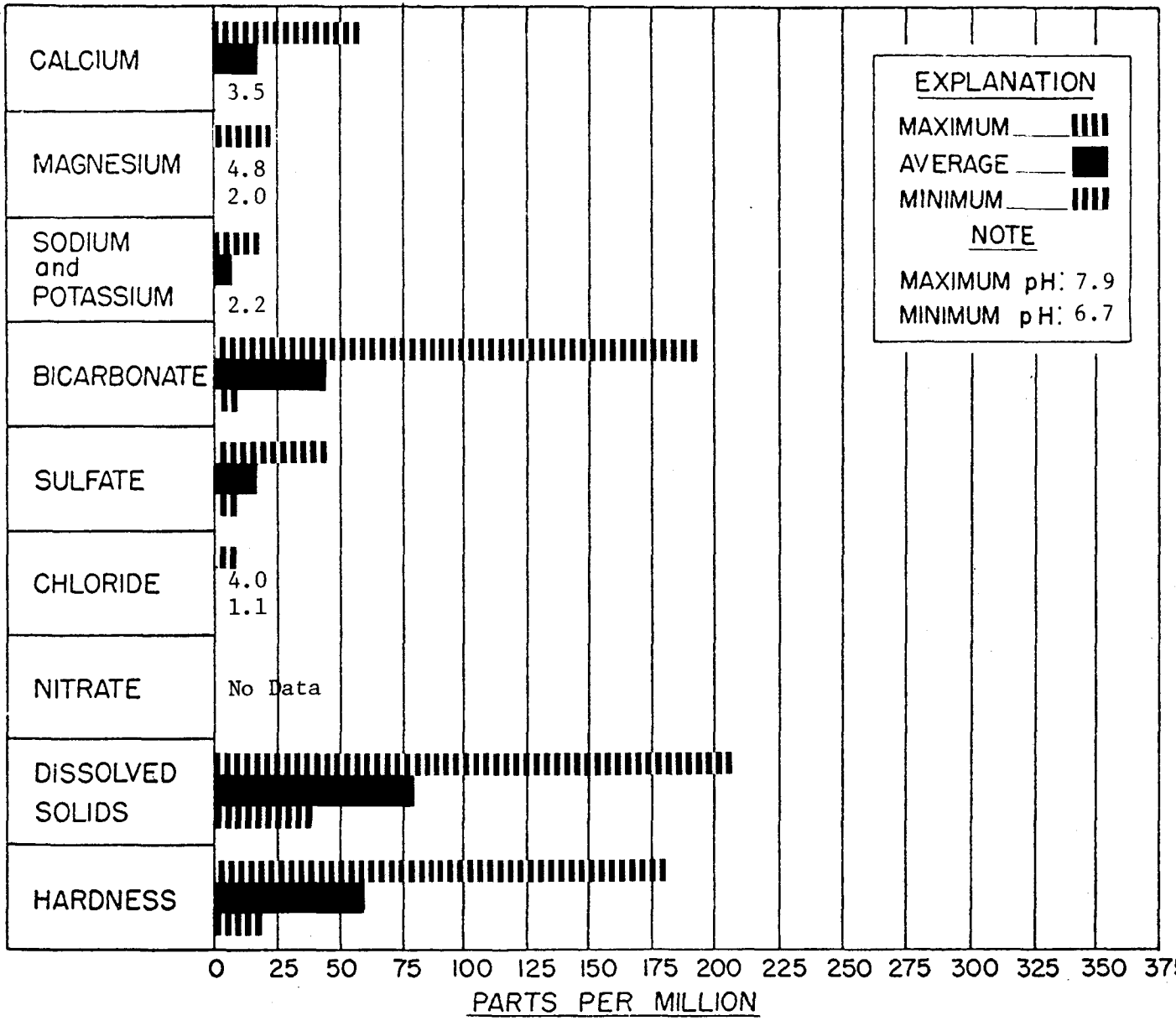


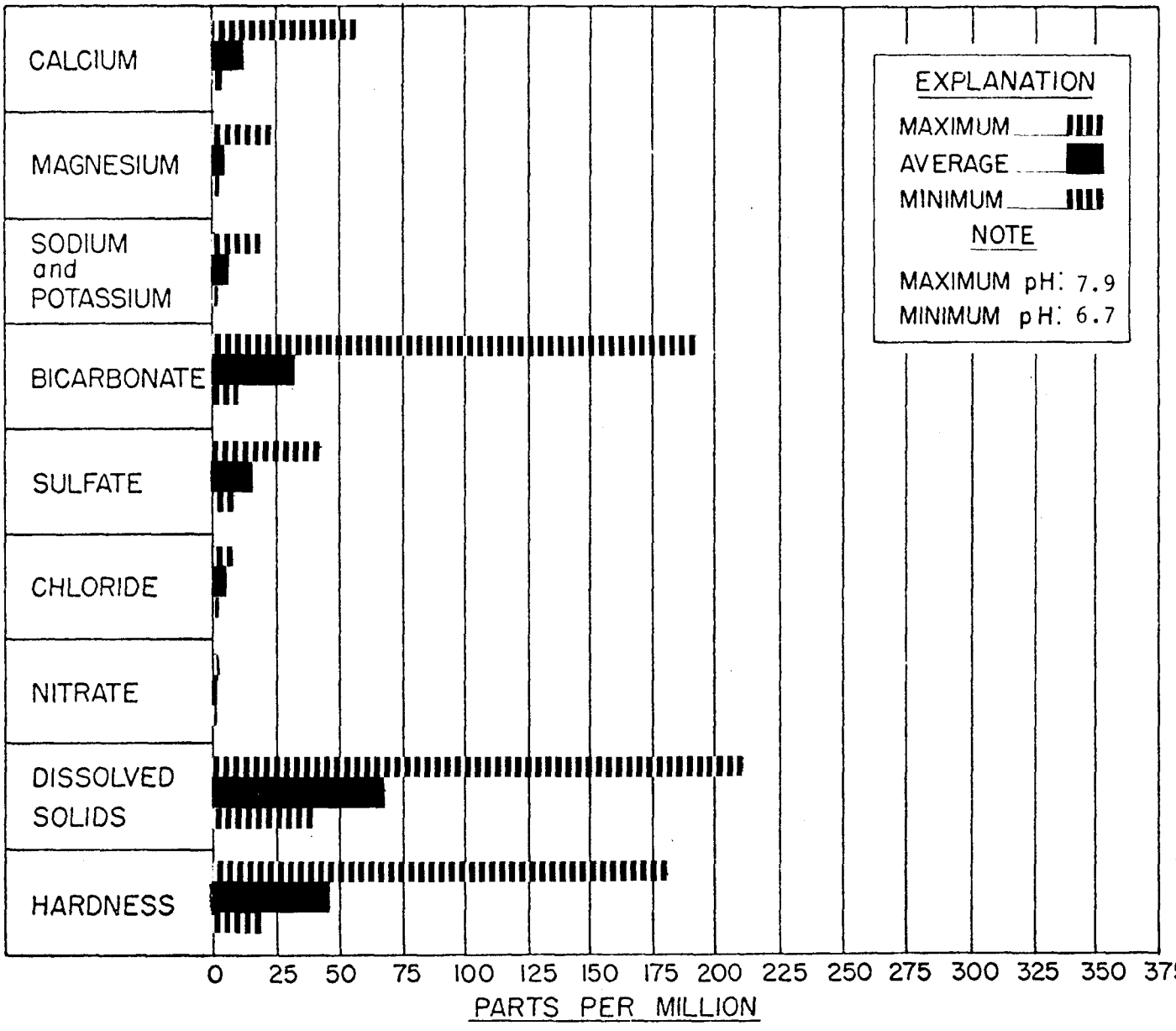
FIGURE H-4

Red River

Pine Ridge

1-73 to 11-74

MAXIMUM, AVERAGE, and MINIMUM concentrations of dissolved constituents,



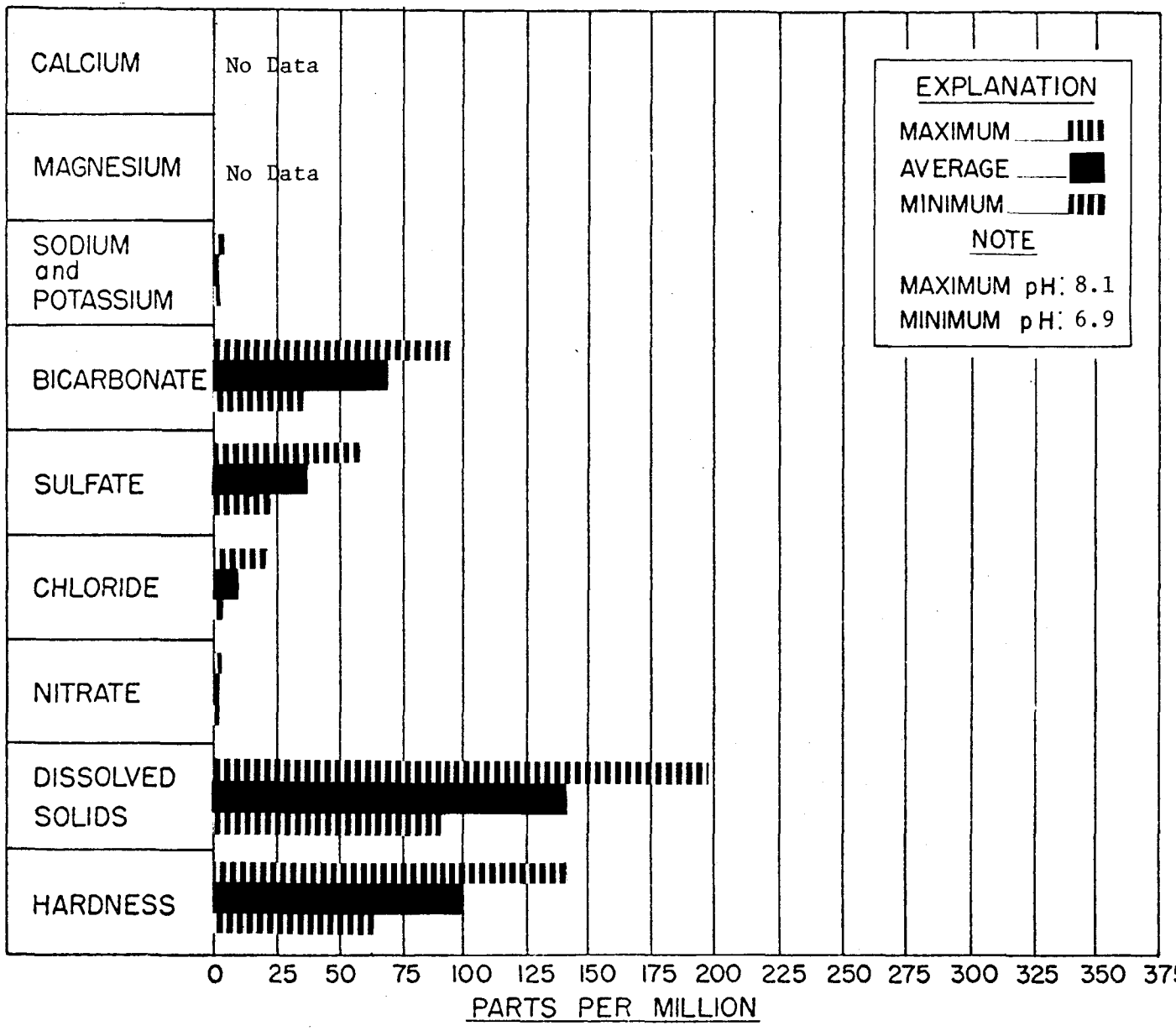
MAXIMUM, AVERAGE, and MINIMUM concentrations of dissolved constituents,

FIGURE H-5

Red River

Pine Ridge

4-69 to 11-74



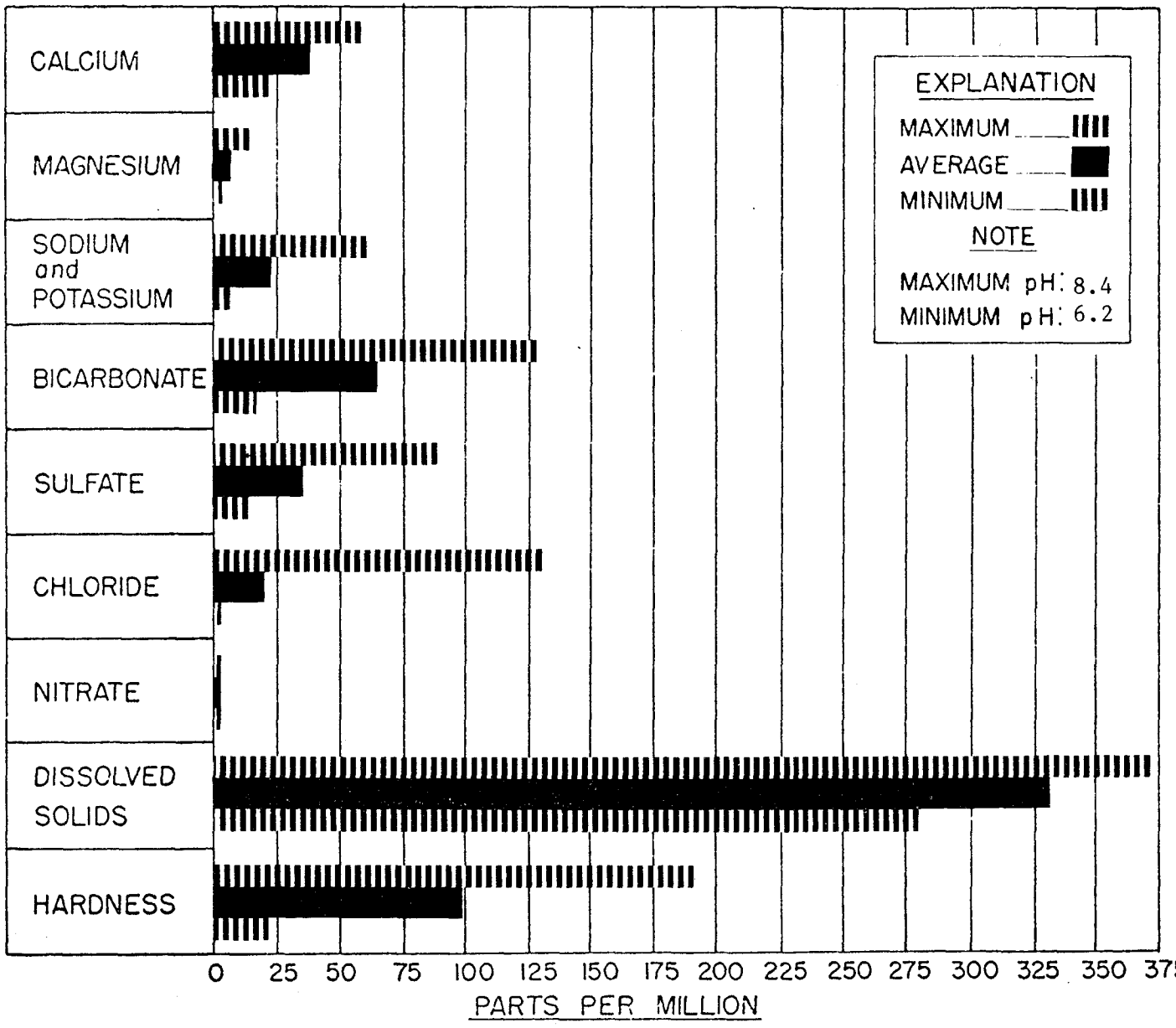
MAXIMUM, AVERAGE, and MINIMUM concentrations of dissolved constituents,

FIGURE H-6

Kentucky River

Lock 4 at Frankfort

1-73 to 11-74



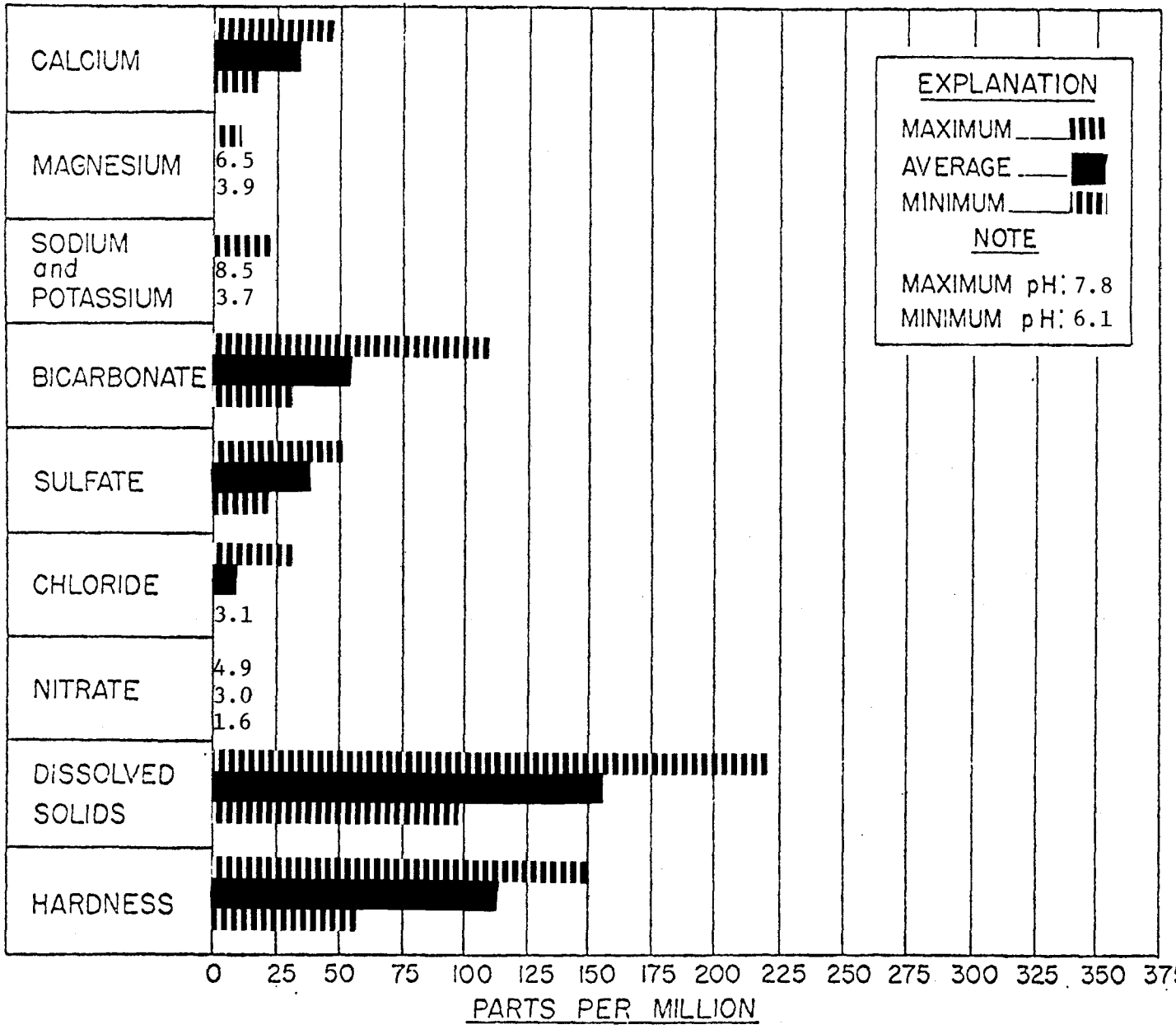
MAXIMUM, AVERAGE, and MINIMUM concentrations of dissolved constituents,

FIGURE H-7

Kentucky River

Lock 4 at Frankfort

10-59 to 9-73



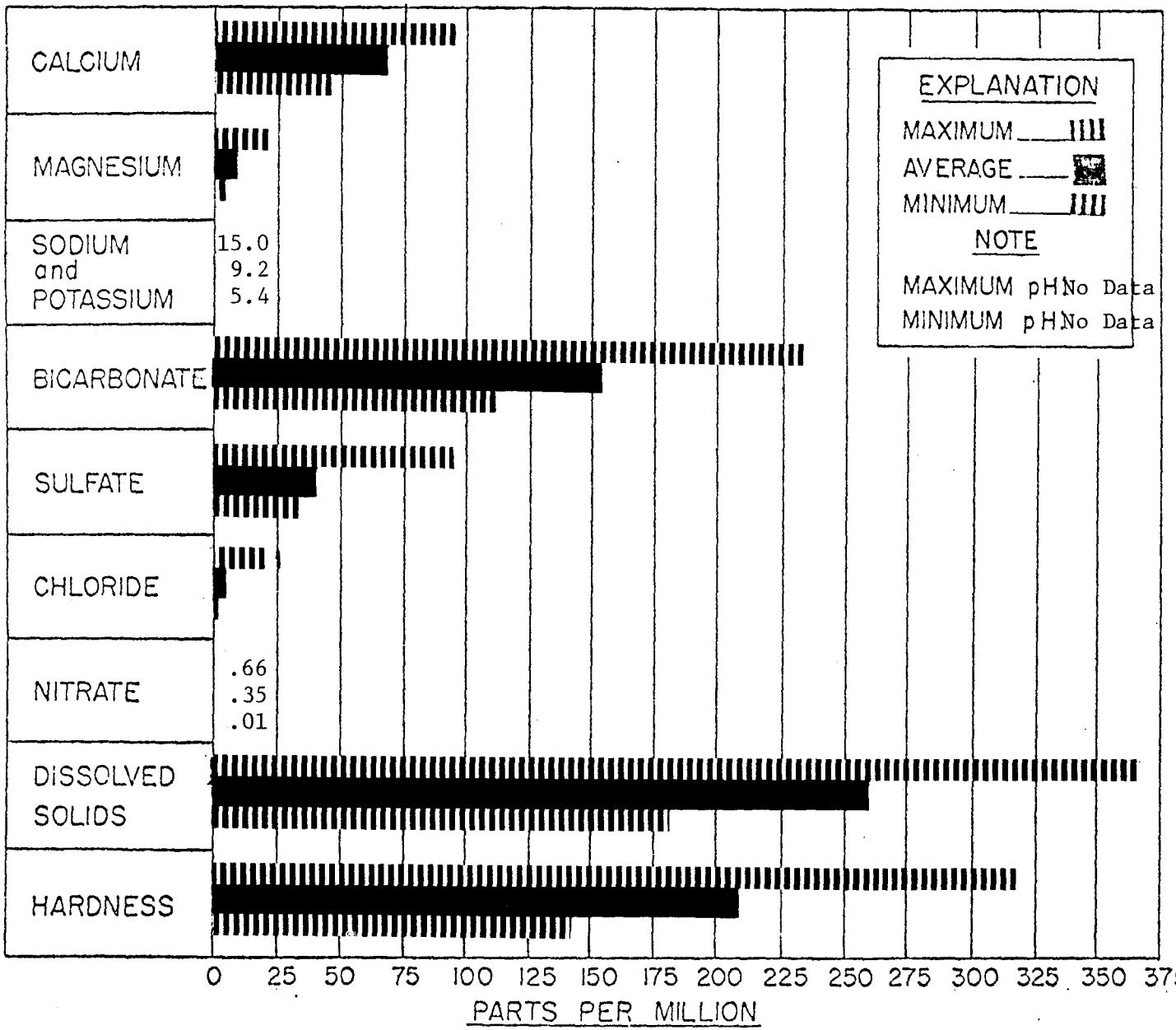
MAXIMUM, AVERAGE, and MINIMUM concentrations of dissolved constituents

FIGURE H-9

Kentucky River

Lock 2

2-73 to 1-76



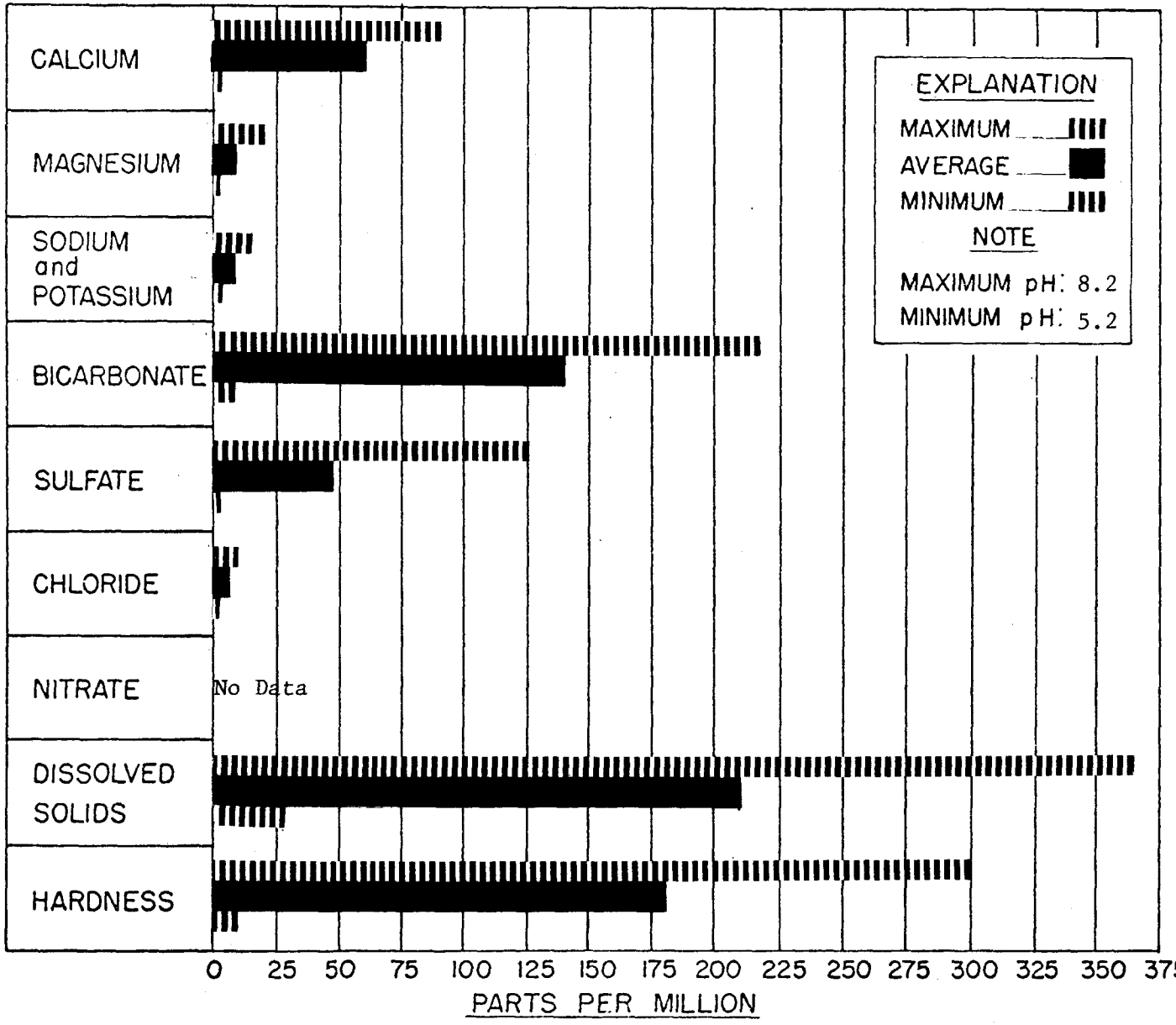
MAXIMUM, AVERAGE, and MINIMUM concentrations of dissolved constituents

FIGURE H-10

Eagle Creek

Glencoe

1-75 to 11-75



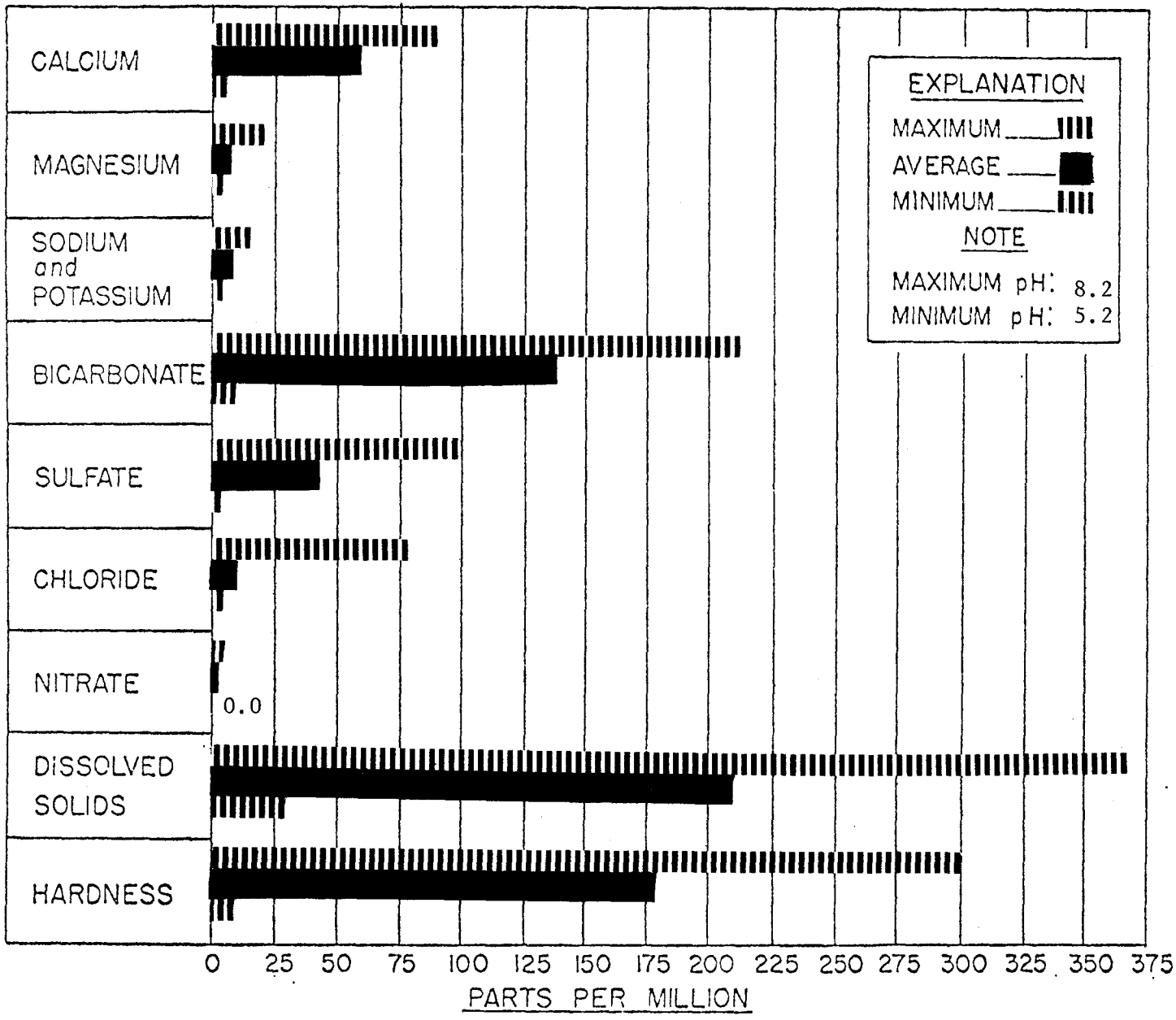
MAXIMUM, AVERAGE, and MINIMUM concentrations of dissolved constituents,

FIGURE H-11

Eagle Creek

Glencoe

2-73 to 11-74



MAXIMUM, AVERAGE, and MINIMUM concentrations of dissolved constituents

FIGURE H-12

Eagle Creek

Glencoe

1-62 to 11-74

of less than 60 mg/l). The data studied indicates that the water in the Red River sub-basin is of the highest quality throughout the entire Kentucky River Basin.

The water quality of the main stem of the Kentucky River is demonstrated in Figures H-6 and H-7. This data was collected at Lock 4 near Frankfort and the river at this point is relatively insensitive due to its large drainage basin representation. This means that large influences are required to change the values measured in water quality. This data shows influences from upstream activities by an increase in dissolved solids and an increase in the hardness of the water. The hardness in the main stem is characterized as moderately hard (calcium bicarbonate hardness of 60 - 120 mg/l).

The North Fork of the Kentucky River at Hazard is just downstream of an intensive coal mining area and demonstrates the effects of such on water quality as can be seen in Figures H-2 and H-3 The North Fork is a relatively sensitive station showing a more rapid change in water quality. The water quality has been degraded by an increase in dissolved solids, hardness, sulfate, magnesium, calcium, sodium and potassium. The chloride levels are high as well as the sodium and potassium levels. This can be attributed to materials related to the coal mining industry. The acidity has increased as demonstrated by a decrease in pH. In general the water quality at this station is regarded as poor.

C. Trace Chemical Water Quality

Trace elements (under 5 mg/l) are separated from the general chemical background of this report because of their influence on human health. Generally, these materials are "heavy" metals, which in sufficient concentrations have a toxic or otherwise adverse effect on human and animal or plant life. Levels for many of these elements have been established for years in the Drinking Water Standards and more recently through the State-Federal Water Quality Standards.

The trace elements measured in the Kentucky River Basin were less than the Kentucky/FederalStandards for Drinking Water with the following exceptions. The station on the North Fork at Hazard yielded data that exceeded Kentucky/ Federal Water Quality Standards in the parameters of iron, manganese, and fluoride. These parameters can be directly or indirectly related to coal mining activities. A point of interest is that 128 million tons of coal were produced in Kentucky in 1973 and it is estimated that by 1985 this production level will reach 400 million tons in Kentucky or over three times that produced in 1973.

D. Waste Load Effects on Water Quality

Within the confines of this report, water quality is considered as affected when the dissolved oxygen concentration drops below 5 mg/l. Approximately 868 miles of stream length were studied under a model used to determine waste load allocations, developed in the Kentucky Continuing Planning Process for River Basin Management Planning. According to this data, approximately 150 miles of that stream length would have a dissolved oxygen concentration of less than 5 mg/l when the flow is equal to or less than the 10 year 7 day low flow. This is highly possible as the flow of many of the tributaries does drop to or below, the 10 year 7 day low flow. It is not predicted that the dissolved oxygen concentration in any segment of the main stem of the river will drop below 5 mg/l.

Of the 150 miles of stream length affected, approximately 124 miles or 83 per cent will be due to municipalities, and 26 miles due to other dischargers such as subdivisions, trailer parks, schools, etc. The waste loads causing this effect totaled approximately 32 million gallons per day (mgd) of discharges with 30 million of it contributed by municipalities and the remaining two million by other discharges.

E. Non-Point Source Effects

Non-point source effects can be summarized in the three categories of agriculture, mining and surface runoff. It is estimated that approximately 1,070 square miles of disturbed forest land, cropland, and field gullies and some 1,700 miles of streambank and roadbank erode excessively and contribute to sediment in the streams. It is further estimated that over 54 square miles of surface mined land is exposed and has an excessive erosion rate.

Surface runoff from urban areas is also a problem in cases where sizable cities are located on low flow streams. There are three such cases in the Kentucky River Basin at the cities of Lexington, Richmond and Danville. This type of source exerts a load on the receiving stream with respect to Biochemical Oxygen Demand (BOD) and suspended solids.

F. Water Uses

The most important use of water is for public water supply. Over 51 million gallons per day is withdrawn for use in this basin. Of this amount, approximately 24 million gallons per day or 48 per cent is used for public supply. The remaining 27 million gallons per day is used for industry. It should be noted that 27 percent, or fourteen million gallons per day, of the total withdrawal is withdrawn from groundwater.

Another major use of water in this basin is for recreational purposes. There are numerous boat docks, camp sites, beaches and other recreational facilities located in the Kentucky River Basin. Furthermore, according to the Kentucky Department of Fish and Wildlife, there are over 2,000 miles of stream in this basin capable of providing a sport fishery with a grand total of 99 species of fishes representing 18 families.

Generally, water in the basin is widely used in the agricultural industry primarily for livestock watering with a small amount used for irrigation. The water in the basin is of sufficient quality for this use

except in areas of extensive coal mining, i.e., in the headwaters.

G. Water Quality Changes

In general, the quality of the water in the Kentucky River Basin is not changing according to the data studied. However, the data taken at the station on the North Fork of the Kentucky River at Hazard reveals that the quality of the water is deteriorating. The concentrations of no less than nine of the parameters studied have increased by considerable amounts. With the energy crisis demanding greater and greater amounts of coal, there is the potential for these problems to increase even more. Much care must be taken in this area to prevent the quality of the water from deteriorating as coal production increases and an effort must be made to upgrade the existing quality of the water.

III. Summary

As stated earlier in this report, the quality of the water in the Kentucky River Basin is good at the station on the main stem of the river at Lock 4 near Frankfort, on the Red River at Pine Ridge and on Eagle Creek at Glencoe. However, the station on the North Fork of the Kentucky River at Hazard reflects the effects of coal mining on water quality.

The two main problems in the basin with regards to water quality are siltation and municipal organic wasteloads.

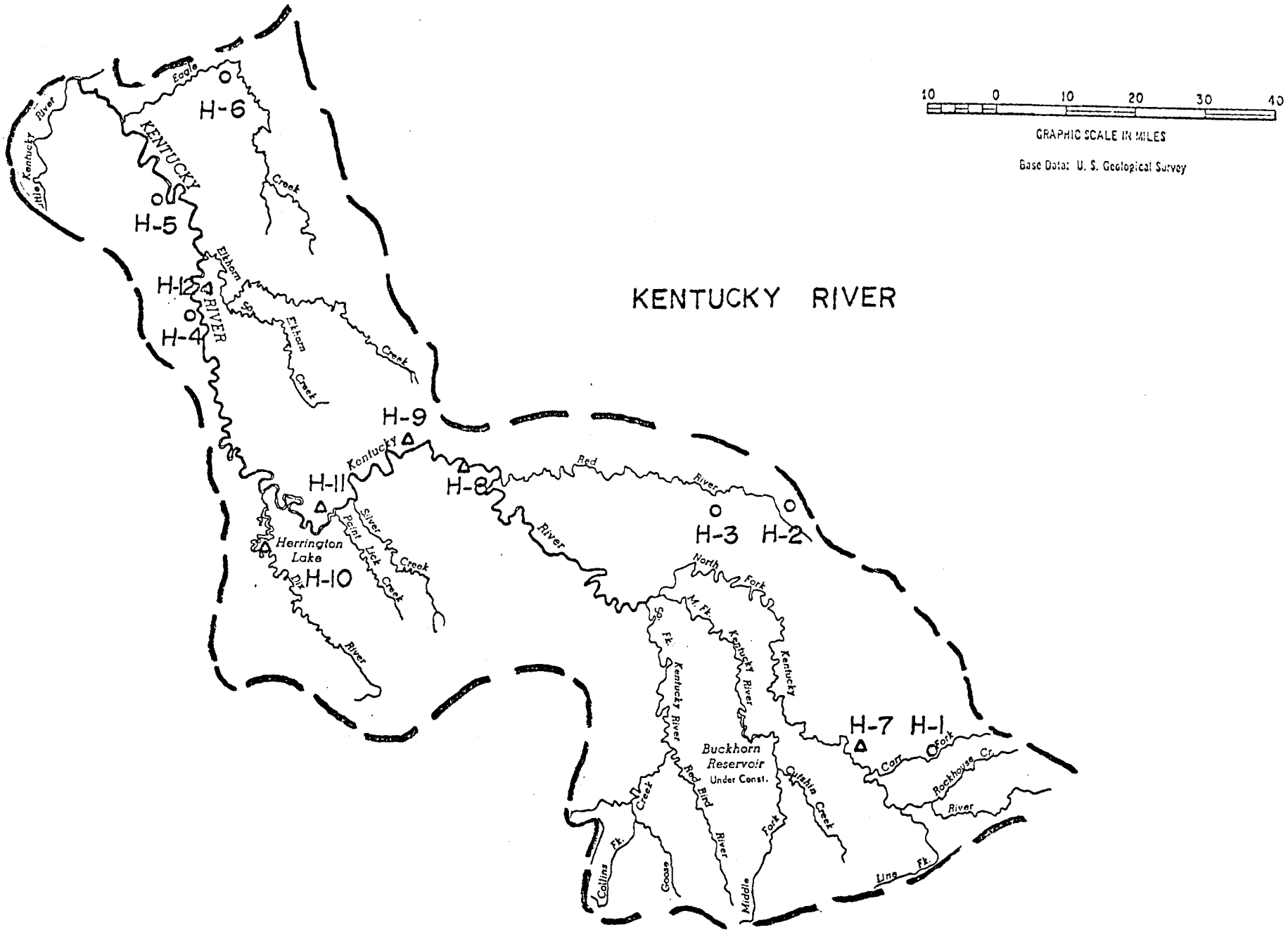
The problem of municipal organic wasteloads is twofold: Inadequate treatment facilities and improper operation of some existing treatment facilities. More emphasis should be placed on the training of wastewater treatment plant operators and recruiting of better qualified personnel to insure proper operation and maintenance of treatment facilities. According to the data, 38 per cent of the existing treatment facilities in this basin need improvements as they are affecting the quality of the water. It should also be noted that 19 per cent of the incorporated cities in the basin presently have no sewers.

The siltation and organic load problems related to urban runoff from sizable cities located on low-flow streams can be improved by the installation or upgrading of storm sewer systems.

The siltation problem related to coal production is localized in the headwaters. The coal producing counties that contribute to this basin are Bell, Clay, Estill, Harlan, Knott, Knox, Leslie, Letcher and Perry. The logging of forest land in preparation for strip mining can result in high runoff rates and serious erosion while the actual strip mining leads to sedimentation from upheval of surface soil. With today's emphasis on increased coal production, this problem will have to be controlled to prevent further degradation of the

water quality. As shown earlier in this report, the quality of the water is already below acceptable standards in this area and measures for improvement need to be emphasized and implemented.

The water quality problems related to coal production cannot be over emphasized. The State of Kentucky is the largest coal producing state in the nation and its production level is predicted to triple within the next few years. This amount of coal mining activity could have a disasterous, practically irreversible effect on the quality of the waters of Kentucky.


KENTUCKY RIVER
10 0 10 20 30 40
GRAPHIC SCALE IN MILES
Base Data: U. S. Geological Survey
H-1
H-2
H-3
H-4
H-5
H-6
H-7
H-8
H-9
H-10
H-11
H-12
Eagle Creek
Kentucky River
KENTUCKY RIVER
Elkhorn Creek
Elkhorn Creek
Kentucky River
Red River
Red River
North Fork
M. Fk.
So. Fk.
Kentucky River
Kentucky River
Kentucky
Herrington Lake
Silver Lick Creek
Dix River
Dix River
Buckhorn Reservoir
Under Const.
Collins Fk.
Goose Creek
Red Bird River
Middle Fork
Cutshin Creek
Ling Fk.
Carr Fork
Rockhouse Cr.
River

STATION KEY

H-1	CARR FORK NEAR SASSAFRAS
H-2	RED RIVER NEAR HAZEL GREEN
H-3	RED RIVER NEAR PINE RIDGE
H-4	KENTUCKY RIVER AT LOCK 4
H-5	KENTUCKY RIVER AT LOCK 2
H-6	EAGLE CREEK AT GLENCOE
H-7	NORTH FORK KENTUCKY RIVER AT HAZARD
H-8	KENTUCKY RIVER AT RICHMOND
H-9	KENTUCKY RIVER AT LEXINGTON WPI
H-10	DIX RIVER AT DANVILLE WPI
H-11	KENTUCKY RIVER AT LOCK 8
H-12	KENTUCKY RIVER AT FRANKFORT WPI

TABLE H-1

SUB-BASINS OF 200 SQUARE MILES OR GREATER IN

THE KENTUCKY RIVER BASIN

Sub-basins	Square Miles
North Fork of Kentucky	1,883.0
South Fork of Kentucky	748.0
Middle Fork of Kentucky	559.0
Red River	487.00
Dix River	442.0
Elkhorn Creek (at lower Dam Site) Mile 2.5	492.0
Eagle Creek	519.0
Station Cam Creek	217.0

NOTE: This information is from the waste load allocation for Kentucky and is an output from the 303e River Basin Planning Effort.

TABLE H-2

COUNTY AREA IN THE KENTUCKY RIVER BASIN

County	Total Area (sq. miles)	Area in Basin (sq. miles)	County	Total Area (sq. miles)	Area in Basin (sq. miles)
Anderson	206	70	Lee	210	210
Bell	370	15	Leslie	409	409
Boyle	183	80	Letcher	339	290
Breathitt	494	494	Lincoln	340	187
Carroll	130	86	Madison	446	446
Clark	259	130	Menifee	210	65
Clay	474	430	Mercer	256	102
Estill	260	260	Montgomery	204	35
Fayette	280	280	Owen	351	351
Franklin	211	211	Owsley	197	197
Garrard	236	236	Perry	341	341
Grant	249	249	Powell	173	173
Harlan	469	70	Rockcastle	311	60
Henry	289	260	Scott	284	284
Jackson	337	135	Shelby	383	70
Jessamine	177	177	Trimble	146	60
Knott	356	255	Wolfe	227	227
Knox	373	38	Woodford	193	193
			Total		7,033

SOURCE: Rand McNally Standard Reference Map and Guide of Kentucky, 1972.

TABLE H-3

SLOPES AND ELEVATIONS OF PRINCIPAL TRIBUTARIES

IN THE KENTUCKY RIVER BASIN

STREAM	LENGTH (Miles)	Max. El. (m.s.l.)	Min. El. (m.s.l.)	AVERAGE SLOPE (ft./miles)
N. Fork of Kentucky River	148.1	1,109	634	3.21
M. Fork of Kentucky River	43.3	757	627	3.00
S. Fork of Kentucky River	85.0	1,250	634	7.25
Goose Creek	21.8	830	754	3.49
Troublesome Creek	42.4	1,004	720	6.69
Red River	59.5	713	566	2.47
Otter Creek	13.1	880	566	23.97
Boone Creek	7.2	780	549	32.08
Silver Creek	39.2	936	531	10.33
Paint Lick Creek	32.0	920	531	12.16
Hickman Creek	31.5	910	514	12.57
Jessamine Creek	13.1	860	519	26.03
Clarks Run Creek	10.4	920	750	16.35
Dix River H.W. to mp 34.6	23.2	822	750	3.27
0.0 slope from mp 34.60 to mouth including reservoir				
Glenns Creek	12.5	830	469	28.88
Elkhorn Creek	90.6	950	454	5.48
Drennon Creek	16.6	800	428	22.41
Stephens Creek	20.9	920	598	15.41
Clarks Creek	15.4	791	586	13.31
Eagle Creek	81.4	737	428	3.80
Little Eagle Creek	12.6	914	737	14.05

NOTE: This information is from the waste load allocation for Kentucky and is an output from the 303e River Basin Planning Effort.

TABLE H-5

LAKES IN THE KENTUCKY RIVER BASIN

Location	County	Surface Area (Acres)	Capacity Acre-Feet
Fishpond Lake	Letcher County	31	1,037
Taylor Fork Lake	Madison County	169	3,572
Corinth Lake	Grant County	96	1,612
Bullock Pen	Grant County	134	2,464
Elmer Davis Lake	Owen County	149	3,151
Pan Bowl Lake	Jackson County	98	1,298
Lexington Reservoirs	Fayette County	408	3,850
Mill Creek Lake	Wolfe County	41	1,049
Elk Lake	Owen County	207	2,654
Herrington Lake	Mercer County	2,940	230,500
Kentucky Utility Fly Ash Disposal	Carroll County	89	2,491
Lake Vega	Madison County	132	1,557
Boltz Lake	Grant County	92	2,168
Total	----------	4,586	257,403
Federal			
Buckhorn Lake	Leslie & Perry County	1,230	21,800
Carr Fork Lake	Knott County	710	6,480
Total	----------	1,940	28,280
Grand Total	----------	6,526	285,683

SOURCE: Kentucky Department for Natural Resources and Environmental Protection, Division of Water Resources.

Table H - 6

City Population and Facility Grant Status
in the Kentucky River Basin in Kentucky

County	City	Population	Project Type	Comments
Anderson				
Bell				
Boyle	Danville- Junction City	12,400 1,046	I	Underway
Breathitt	Jackson	1,887	I	Underway
Carroll	Carrol	3,884	I	Pending
Clark				
Clay	Manchester	1,664	I	Underway
Estill	Irving- Ravenna	2,918 734	I	Underway
Fayette	Lexington-Main Lexington-West Hickman	73,500 43,500	I I	Underway Underway
Franklin	Frankfort	22,700	I	Underway
Garrard	Lancaster	3,230	I	Underway
Grant	Williamstown Dry Ridge	2,063 1,100	I III	Underway Underway
Harlan				

Table H - 6
Continued

County	City	Population	Project Type	Comments
Henry	New Castle	755	I	Underway
Jackson				
Jessamine	Nicholasville	5,829	I	Underway
	Wilmore	3,466	None	Sewered
Knott	Hindman	808	I	Pending
Knox				
Lee	Beattyville	923	I	Underway
Leslie	Hyden	482	None	Sewered
Letcher	Whitesburg	1,137	I	Pending
	Neon-Fleming	1,178	II	Pending
Lincoln	Stanford	2,474	I	Underway
	Crab Orchard	861	I	No Sewers
	Hustonville	413	I	No Sewers
Madison	Berea #1	4,600	I	Underway
	Berea #2	2,300	I	Underway
	Richmond #1	10,100	I	Underway
	Richmond #2	7,700	I	Underway
Menifee				
Mercer	Burgin	1,002	I	Underway
Montgomery				

Table H - 6
Continued

County	City	Population	Project Type	Comments
Owen	Owenton	1,280	I	Pending
Owsley	Booneville	126	None	Sewered
Perry	Hazard	5,459	I	Pending
	Vicco	377	I	Underway
Powell	Stanton-Clay City	2,037	I	Underway
Rockcastle	Brodhead	769	None	Sewered
Scott	Georgetown	8,629	I	Underway
	Stamping Ground	411	III	No Sewers
	Sadieville	272	None	No Sewers
Shelby				
Trimble				
Wolfe	Campton	419	I	Underway
Woodford	Versailles	5,679	I	Underway
	Midway	1,278	I	Pending

Source: Kentucky Department for Natural Resources and Environmental Protection, Division of Water Quality

TABLE H-7

Organic Loads Affecting Streams in the Kentucky River Basin

Length of streams to which treated organic loads are discharged		868
Stream length for which dissolved oxygen is predicted to be below 5 mg/l during periods of low flow		145
Stream length for which dissolved oxygen is predicted to be below 5 mg/l during periods of low flow due to	Municipal Discharges	119
	Industrial Discharges	---
	Other Discharges	26

NOTE: This information is from the waste load allocation for Kentucky and is an output from the 303e river basin planning effort. The values indicated the stream miles in which the dissolved oxygen is predicted to be less than 5 mg.l when the stream flow is less than the once in ten year, seven day, low flow.

Table H-8

LOCKS AND DAMS ON THE KENTUCKY RIVER

Lock No.	Miles Above Mouth	Length of Pool Above Dam (miles)
1	4.0	27.0
2	31.0	11.0
3	42.0	23.0
4	65.0	17.2
5	82.2	14.0
6	96.2	20.8
7	117.0	22.9
8	139.9	17.6
9	157.5	18.9
10	176.4	24.6
11	201.0	19.9
12	220.9	19.0
13	239.9	9.1
14	249.0	-

Navigation Charts
U. S. Army Corps of Engineers
Louisville District

Table H-9

Water Quality Data for the Kentucky River Basin

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
STORET #00400	pH Specific Units		Kentucky Standard 6-LT pH LT 9				
Carr Fork near Saasafras							
U.S.G.S. 03277450	70/07/07	74/07/16	7.18	8.0	6.4	33	.360
North Fork Kentucky	75/01/16	75/01/16	7.4			1	
River at Hazard	70/01/31	74/06/11	7.4	8.2	6.2	91	.413
U.S.G.S. 0327750	65/01/07	75/01/16	7.3	8.2	3.8	210	.530
	62/01/08	74/06/--	7.2	9.5	3.8	276	0.7
Red River near Hazel Green							
U.S.G.S. 03282500	70/10/02	72/09/12	7.1	7.3	6.8	3	.289
Red River near	71/01/13	74/07/08	7.1	7.8	6.7	33	.237
Pine Ridge	69/08/08	70/11/04	7.3	7.7	6.7	13	.326
U.S.G.S. 03283100	69/03/20	69/03/05	7.5	7.5	7.5	2	.00
Kentucky River Lock 4	70/01/02	73/09/26	7.6	8.1	6.8	92	.308
U.S.G.S. 03287500	65/01/13	73/09/26	7.5	8.4	6.7	208	.334
	59/10/25	73/09/26	7.5	8.4	5.2	206	.370
Kentucky River Lock 2	75/01/07	75/01/07	7.0	7.8	6.1	13	.459
U.S.G.S. 03290500	73/02/07	74/11/05	7.4	7.7	6.5	17	.294
Eagle Creek at Glencoe	75/07/14	75/07/14	7.7			1	
U.S.G.S. 03291500	70/08/06	74/10/07	7.6	8.1	7.0	39	.267
	62/01/25	74/10/07	7.6	8.1	7.0	41	.263
STORET #00095	Conductivity Micromhos,		Kentucky Standard 800 micromhos				
Carr Fork near	75/01/28	75/11/12	317.3	554.0	171.0	8	156.2
Sassafras	70/07/07	74/12/17	295.0	507.0	84.0	41	94.2
North Fork Kentucky	75/01/16	75/01/16	271.0			1	
River at Hazard	70/01/31	74/06/11	392.4	946.0	100.0	93	197.5
	62/10/08	74/06/11	7.2	8.2	3.8	264	.599
Red River near Hazel Green	70/10/02	72/09/12	145.0	157.0	126.0	277.1	16.6
Red River near	75/01/21	75/12/03	90.1	134.0	58.0	8	28.0
Pine Ridge	71/01/13	74/07/08	92.7	148.0	58.0	37	26.3
	69/08/08	70/11/04	121.5	160.0	76.0	13	27.9
	68/11/21	69/06/05	99.0	110.0	82.0	3	14.9

Table H-9
Continued

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
Kentucky River Lock 4	75/03/14	75/03/14	210.0			1	
	70/01/02	74/08/26	258.1	646.0	115.0	96	98.3
	65/01/13	74/08/26	265.4	675.0	115.0	222	104.4
	59/10/03	74/08/26	253.0	675.0	76.0	388	94.9
Kentucky River Lock 2	75/01/07	76/01/07	232.0	275.0	185.0	11	32.1
	73/02/07	74/12/09	248.6	336.0	123.0	23	40.0
Eagle Creek at Glencoe	75/01/30	75/11/07	436.0	160.0	10.0	7	101.5
	70/08/06	74/12/09	365.8	617.0	204.0	48	85.6
	70/08/06	74/12/09	365.8	617.0	204.0	48	85.6
	62/01/25	74/12/09	361.2	617.0	204.0	50	86.8
STORET #70300	Dissolved Solids Milligrams/liter KY. Std. 500 mg/l						
Carr Fork near Sassafras	75/01/28	75/12/17	193.3	321.0	106.0	9	86.6
	70/07/07	74/12/17	189.6	326.0	48.0	41	60.6
North Fork Kentucky River at Hazard	70/01/31	74/06/11	259.3	676.0	58.0	91	141.1
	65/01/07	74/06/11	267.9	810.0	58.0	219	147.5
	62/10/08	74/06/11	290.8	1800.0	58.0	294	188.7
Red River near Hazel Green	70/10/02	72/09/12	90.0	100.0	74.0	3	14.0
Red River near Pine Ridge	75/01/21	75/10/21	58.9	96.0	30.0	8	21.5
	74/10/01	74/12/16	69.0	74.0	64.0	2	7.07
	70/11/04	69/08/08	73.4	94.0	41.0	13	15.6
	69/03/20	69/06/05	62.5	73.0	52.0	2	14.8
Kentucky River Lock 4	70/01/02	73/09/26	158.5	400.0	54.0	92	60.5
	65/01/13	73/09/26	162.6	400.0	54.0	218	62.8
	59/10/03	73/09/26	150.2	400.0	8.2	414	55.5
Kentucky River Lock 2	75/01/07	74/12/04	148.8	215.0	118.0	12	26.3
	73/02/07	74/12/09	160.4	220.0	96.0	24	26.0
Eagle Creek at Glencoe	75/01/30	75/12/18	260.0	368.0	184.0	7	63.6
	70/08/06	74/12/09	231.6	385.0	136.0	48	54.6
	70/08/06	74/12/09	231.6	385.0	136.0	48	54.6
	62/01/25	74/12/09	229.0	385.0	136.0	50	55.0
STORET #00410	Alkalinity mg/l No Standard						
Carr Fork near Sassafras	75/01/28	75/12/17	73.3	201.0	21.0	9	63.1
	70/07/07	74/12/17	51.2	141.0	11.0	41	31.8

Table H-9
Continued

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
North Fork Kentucky	75/01/16	75/01/16	43.0			1	
Hazard	70/01/31	74/06/11	52.0	125.0	8.0	91	29.4
	62/12/20	74/06/11	49.2	125.0	.00	170	38.6
	65/01/07	74/06/--	55.0	205.0	0.0	177	42.0
Red River near Hazel Green	70/10/02	72/09/12	43.7				
Red River near	75/01/21	75/10/21	25.4	41.0	10.0	8	11.9
Pine Ridge	74/10/01	74/12/16	26.5	33.0	20.0	2	9.2
	71/01/13	74/07/08	25.5	51.0	9.0	37	13.1
	69/08/08	70/11/04	33.2	54.0	13.0	13	12.8
	69/03/20	69/06/05	26.0	33.0	19.0	2	9.9
Kentucky River Lock 4	70/01/02	73/09/26	65.4	156.0	28.0	92	20.5
	65/01/13	73/09/26	65.4	156.0	28.0	166	18.8
	59/10/25	73/09/26	65.0	156.0	16.0	229	20.0
Kentucky River Lock 2	75/01/07	75/12/04	76.3	103.0	59.0	12	12.9
	73/02/07	74/12/09	79.2	110.0	28.0	24	17.4
Eagle Creek at	75/01/30	75/12/18	153.1	232.0	112.0	9	38.5
Glencoe	70/08/06	74/12/09	142.5	217.0	78.0	48	32.5
STORET #00900	Hardness mg/l, 0-60 Soft, 61-120 moderately hard, 121-180 hard, over 180 very hard						
Carr Fork near	75/01/28	75/12/17	122.6	200.0	74.0	9	49.5
Sassafras	70/07/07	74/12/17	122.2	233.0	36.0	41	41.1
North Fork Kentucky	70/01/31	73/09/15	148.5	370.0	12.0	90	78.9
River, Hazard	65/01/07	73/09/15	148.2	422.0	12.0	208	79.1
	62/10/08	73/09/15	157.9	1090.0	12.0	257	107.2
Red River near Hazel Green	70/10/02	72/09/12	59.0	71.0	48.0	3	11.5
Red River near	75/01/21	75/10/21	37.5	55.0	25.0	8	10.9
Pine Ridge	74/10/01	74/12/16	42.5	52.0	33.0	2	13.4
	71/01/13	74/07/08	36.7	59.0	18.0	36	12.0
	69/08/08	70/11/04	46.2	62.0	25.0	13	11.6
	69/03/20	69/06/05	38.5	47.0	30.0	2	12.0
Kentucky River Lock 4	70/01/02	73/09/26	104.5	190.0	49.0	92	31.7
	65/01/13	73/09/26	104.7	192.0	48.0	208	30.8
	59/10/03	73/09/26	99.2	192.0	21.0	381	28.9

Table H-9
Continued

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
Kentucky River Lock 2	75/01/07	75/12/04	110.4	130.0	90.0	12	14.8
	73/02/07	74/12/09	113.3	150.0	56.0	24	18.6
Eagle Creek at Glencoe	75/01/30	75/12/18	208.9	320.0	140.0	9	54.4
	70/08/06	74/12/09	185.0	300.0	94.0	48	47.1
	62/01/25	74/12/09	182.4	300.0	94.0	50	47.8
STORET #00080	Color Platinum - Cobalt Units, Prop. EPA Std. 75 Units						
Carr Fork near Sassafras	75/01/28	75/12/17	210.4	1200.0	1.0	9	405.3
	70/07/07	74/12/17	39.6	500.0	4.0	40	92.4
North Fork Kentucky River at Hazard	70/11/03	72/10/15	8.3	15.0	.00	3	7.6
	65/01/07	72/10/15	8.2	50.0	.00	68	9.0
	62/10/08	72/10/15	7.9	50.0	.00	117	8.4
Red River near Pine Ridge	75/01/21	75/10/21	13.1	40.0	5.0	8	12.0
	74/10/01	74/12/16	10.0	10.0	10.0	2	.00
	71/01/13	74/07/08	16.4	70.0	5.0	34	15.4
	69/08/08	70/11/04	12.8	25.0	4.0	13	7.8
	69/03/20	69/06/05	7.5	10.0	5.0	2	3.5
Kentucky River Lock 4	70/10/07	72/10/21	6.6	10.0	.00	3	5.8
	65/01/13	72/10/21	8.0	50.0	.00	65	8.2
	59/10/25	72/10/21	8.9	50.0	.00	138	7.8
Eagle Creek at Glencoe	75/01/30	75/12/18	47.9	160.0	10.0	9	48.6
	70/08/06	74/12/09	49.2	300.0	5.0	45	52.8
	62/01/25	74/12/09	48.5	300.0	5.0	47	51.7
STORET #00930	Sodium mg/l, No Standard						
Carr Fork near Sassafras	75/01/28	75/12/17	14.2	52.0	2.9	9	16.5
	70/07/07	74/12/17	10.1	33.0	1.6	41	6.2
North Fork Kentucky River at Hazard	70/11/03	72/10/15	38.0	56.0	26.0	3	15.9
	65/07/25	72/10/15	38.2	60.0	17.0	9	18.9
Red River near Pine Ridge	74/10/01	74/12/16	2.6	3.0	2.1	2	.636
	71/01/13	74/07/08	2.7	4.8	1.4	36	.889
	69/08/08	70/11/04	3.9	6.2	2.2	13	1.25
	69/03/20	69/06/05	3.1	3.2	2.9	2	.212
Kentucky River Lock 4	70/10/07	72/10/21	42.3	56.0	34.0	3	11.0
	67/07/27	72/10/21	42.2	56.0	33.0	6	10.5
	59/10/25	72/10/21	17	56.0	4.1	17	18.3

Table H-9
Continued

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
Kentucky River Lock 2	75/01/07	75/12/04	6.5	16.0	3.3	12	3.73
	73/02/07	74/12/09	6.1	14.0	2.3	24	2.54
Eagle Creek at Glencoe	75/01/30	75/12/18	6.2	11.0	3.5	9	2.24
	70/08/06	74/12/09	4.6	9.1	1.7	47	1.72
	62/01/25	74/12/09	4.5	9.1	1.7	49	1.77
STORET #00934	Potassium mg/l, No Standard						
Carr Fork near Sassafras	75/01/28	75/12/17	2.6	4.0	1.60	9	.889
	70/07/07	74/12/17	2.9	5.8	1.4	41	1.03
North Fork Kentucky River at Hazard	70/11/03	72/10/15	5.8	8.0	3.4	3	2.31
	65/07/25	72/10/15	5.3	8.0	3.4	6	1.70
Red River near Pine Ridge	75/01/21	75/10/21	1.9	4.2	1.0	8	1.10
	74/10/01	74/12/16	1.6	2.0	1.1	2	.636
	71/01/13	74/07/08	1.9	3.6	1.0	36	.678
	69/08/08	70/11/04	2.3	3.8	1.4	13	.684
	69/03/20	69/06/05	1.5	1.9	1.0	2	.636
Kentucky River Lock 4	70/10/07	72/10/21	3.9	4.6	3.4	3	.611
	67/07/27	72/10/21	3.4	4.6	2.7	6	.713
	59/10/25	72/10/21	2.6	4.6	1.6	17	.801
Kentucky River Lock 2	75/01/07	75/12/04	2.1	3.3	1.4	58	.583
	73/02/07	74/12/09	2.5	3.7	1.5	24	.75
Eagle Creek near Glencoe	74/01/30	75/12/18	3.0	4.0	1.9	9	.813
	70/08/06	74/12/09	3.4	5.8	1.7	47	1.10
	62/01/25	74/12/09	3.4	5.8	1.7	49	1.10
STORET #00940	Chloride mg/l, Prop. EPA Standard 250 mg/l						
Carr Fork near Sassafras	75/01/28	75/12/17	3.9	10.0	1.2	9	2.89
	70/07/07	74/12/17	4.5	13.0	1.0	41	2.78
North Fork Kentucky near Hazard	75/01/16	75/01/16	7.3			1	
	70/01/31	73/09/15	6.2	36.0	1.5	90	5.09
	62/10/08	73/09/15	7.7	40.0	.00	257	6.31
Red River near Hazel Green	70/10/02	72/09/12	6.3	6.7	5.7	3	.513

Table H-9
Continued

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
Red River near Pine Ridge	75/01/21	75/01/21	2.8	5.2	1.4	8	1.27
	74/10/01	74/12/16	2.9	2.9	2.9	2	.000
	71/01/13	74/07/08	3.7	7.0	1.1	36	1.52
	69/08/08	70/11/04	5.6	8.0	3.0	13	1.57
	69/03/20	69/06/05	3.5	4.0	3.0	2	.707
Kentucky River Lock 4	70/01/02	73/09/26	16.0	130.0	1.9	92	20.1
	65/01/13	73/09/26	19.7	130.0	1.9	208	23.7
	59/10/25	73/09/26	19.6	130.0	1.9	283	22.9
Kentucky River Lock 2	75/01/07	75/12/04	9.1	29.0	3.5	12	7.04
	73/02/07	74/12/09	9.2	18.0	3.1	24	3.50
Eagle Creek at Glencoe	75/01/30	75/12/18	7.3	18.0	3.0	8	4.44
	70/08/06	74/12/09	8.0	80.0	2.3	48	10.9
	62/01/25	74/12/09	7.7	80.0	1.0	50	10.7
STORET # 00945	Sulfate (mg/l), Prop. EPA Standard 250 mg/l						
Carr Fork near Sassafras	70/07/07	74/12/17	83.9	186.0	23.0	41	26.9
North Fork Kentucky River at Hazard	75/01/16	75/01/16	71.0			1	
	70/01/31	74/06/11	132.2	340.0	13.0	91	74.4
	62/10/08	74/06/11	150.6	997.0	13.0	258	108.1
Red River near Hazel Green	70/10/02	72/09/12	16.7	19.0	13.0	3	3.2
Red River near Pine Ridge	75/01/21	75/10/21	12.5	13.0	11.0	8	.756
	74/10/01	74/12/16	14.0	14.0	14.0	2	.000
	71/01/13	74/07/08	13.8	20.0	9.8	37	2.15
	69/03/20	69.06/05	15.0	15.0	15.0	2	.000
Kentucky River Lock 4	70/01/02	73/09/26	37.8	89.0	18.0	92	13.2
	65/01/13	73/09/26	35.8	89.0	17.0	208	12.0
	59/10/25	73/09/26	34.0	89.0	13.0	283	11.9
Kentucky River Lock 2	75/01/07	75/12/04	32.0	44.0	25.0	12	6.47
	73/02/07	74/12/09	32.0	51.0	21.0	24	7.66
Eagle Creek at Glencoe	75/01/30	75/12/18	53.1	91.0	35.0	8	17.7
	70/08/06	74/12/09	43.5	100.0	19.0	48	15.9
	62/01/25	74/12/09	42.7	100.0	19.0	50	16.2

Table H-9
Continued

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
Eagle Creek at Glencoe	75/01/30	75/12/18	.27	.60	.10	9	.141
	70/08/06	74/12/09	.29	1.1	.10	48	.188
	62/01/25	74/12/09	.294	1.1	0.1	50	.189
STORET #00915	Calcium, Milligrams/liter, No Standard						
Carr Fork near Sassafras	75/01/28	75/12/17	29.8	51.0	17.0	9	13.3
	70/07/07	74/12/17	29.7	57.0	7.7	41	11.3
North Fork Kentucky River at Hazard	70/11/03	72/10/15	60.0	72.0	38.0	3	19.1
	68/10/13	72/10/15	73.4	131.0	38.0	5	35.0
Red River near Pine Ridge	75/01/21	75/10/21	10.2	16.0	6.3	8	3.7
	74/10/01	74/12/16	12.2	15.0	9.4	2	3.96
	71/01/13	74/07/08	9.4	16.0	3.5	36	3.54
	69/08/08	70/11/04	12.0	17.0	5.1	13	3.58
	69/03/20	69/06/05	9.3	11.0	7.5	2	2.47
Kentucky River Lock 4	70/10/07	72/10/21	46.3	50.0	42.0	3	4.04
	68/12/11	72/10/21	50.4	47.0	42.0	5	6.27
	59/10/25	72/10/21	36.7	57.0	21.0	19	11.1
Kentucky River Lock 2	75/01/07	75/12/04	33.4	40.0	27.0	12	4.70
	73/02/07	74/12/09	34.6	47.0	15.0	24	6.34
Eagle Creek at Glencoe	75/01/30	75/12/18	64.8	94.0	46.0	9	15.8
	70/08/06	74/12/09	60.3	88.0	29.0	47	14.4
	62/01/24	74/12/09	59.6	88.0	29.0	49	14.7
STORET #00925	Magnesium, mg/l, No Standard						
Carr Fork near Sassafras	75/01/28	75/12/17	11.7	18.0	6.4	9	4.25
	70/07/07	74/12/17	11.7	22.0	3.5	41	3.60
North Fork Kentucky River at Hazard	70/11/03	72/10/15	25.3	29.0	20.0	3	4.73
	68/10/13	72/10/15	24.0	29.0	20.0	5	3.87
Red River near Pine Ridge	75/01/21	75/10/21	2.9	3.7	2.2	8	.504
	74/10/01	74/12/16	2.9	3.5	2.3	2	.894
	71/01/13	74/07/08	3.2	5.8	1.7	36	.922
	69/08/08	70/11/04	3.9	5.3	2.8	13	.766
	69/03/20	69/06/05	3.8	4.7	2.8	2	1.34
Kentucky River Lock 4	70/10/07	72/10/21	13.0	14.0	11.0	3	1.73
	68/12/11	72/10/21	12.6	14.0	11.0	5	1.34
	59/10/25	72/10/21	7.5	14.0	3.1	19	3.38

Table H-9
Continued

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
STORET #00618	Nitrate - N mg/l, Prop. EPA Standard 10 mg/l						
Carr Fork near Sassafras	75/01/28	75/12/17	.22	.43	.01	9	.157
	71/10/19	74/12/17	.41	4.5	.00	29	.814
North Fork Kentucky at Hazard	71/10/18	73/09/15	.54	2.2	.10	50	.329
Red River near Hazel Green	72/09/12	72/09/12	1.1			1	
Red River near Pine Ridge	75/01/21	75/12/03	.21	.39	.06	9	.106
	74/10/01	74/12/16	.18	.31	.05	2	.184
	71/10/27	74/07/08	.15	.50	.00	28	.138
Kentucky River Lock 4	71/10/06	73/09/26	.70	1.2	.40	49	.189
Eagle Creek at Glencoe	75/01/30	75/12/18	.35	.66	.01	8	.224
	71/10/14	74/12/09	.40	1.1	.00	33	.351
STORET #00950	Fluoride mg/l Prop. EPA Standard 10 mg/l						
Carr Fork near Sassafras	75/01/28	75/12/17	.23	.70	.00	9	.200
	70/07/07	74/12/17	.16	.40	.00	41	.084
North Fork Kentucky River at Hazard	70/09/16	73/03/30	.45	3.7	.10	12	1.02
	68/10/13	73/03/30	.41	3.7	.10	14	.947
Red River near Hazel Green	70/10/02	72/09/12	.10	.10	.10	3	.00
Red River near Pine Ridge	75/01/21	75/10/21	.24	.80	.00	8	.262
	74/10/01	74/12/12	.05	.10	.00	2	.071
	71/01/13	74/07/08	.13	.40	.00	36	.091
	69/08/08	70/11/04	.09	.20	.00	13	.064
	69/03/20	69/06/05	.20	.20	.20	2	.00
Kentucky River Lock 4	70/10/07	72/10/21	.17	.30	.10	6	.082
	67/07/27	72/10/21	.18	.30	.10	9	.067
	59/10/25	72/10/21	.21	.40	.10	18	.073
Kentucky River Lock 2	75/01/07	75/12/04	.20	.50	.10	12	.121
	73/02/07	74/12/09	.20	.40	.00	24	.100

Table H-9
Continued

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
Kentucky River Lock 2	75/01/07	75/12/04	6.6	8.4	5.4	12	1.08
	73/02/07	74/12/09	6.4	11.0	3.9	24	1.57
Eagle Creek at Glencoe	75/01/30	75/12/18	11.4	21.0	6.8	9	4.16
	70/08/06	74/12/09	8.7	20.0	4.2	47	3.25
	62/01/25	74/12/09	8.5	20.0	4.2	49	3.3
STORET #01025	Cadium, micrograms/liter, Kentucky Standarg, 100 ug/l						
North Fork Kentucky River at Hazard	75/03/20	75/06/17	.33	1.0	.00	3	.577
	74/04/16	74/10/03	1.25	4.0	.00	4	1.89
	63/10/25	74/10/03	.50	4.0	.0	10	1.27
Red River near Hazel Green	75/07/08	75/08/19	.5	1.0	.00	2	.707
Kentucky River Lock 4	75/01/22	75/04/21	.67	1.0	.00	3	.577
	74/03/11	74/09/30	1.0	6.0	.00	7	2.24
	62/11/12	74/09/30	.411	6.0	.00	17	1.46
Kentucky River Lock 2	75/01/07	75/10/08	1.25	2.0	.00	4	.957
	73/04/17	74/10/11	1.8	7.0	.00	8	2.25
Eagle Creek at Glencoe	75/06/06	75/06/06	.00			1	
	74/03/16	74/12/09	2.7	7.0	.00	6	2.58
STORET # 01056	Manganese, micrograms/liter Prop. Standard 50 ug/l						
Carr Fork near Sassafras	75/01/28	75/12/17	343.3	500.0	150.0	9	103.1
	71/10/19	74/12/17	354.0	1200.0	6.0	28	218.4
North Fork Kentucky River at Hazard	74/04/16	74/04/16	83.0			1	
Red River near Pine Ridge	75/01/21	75/10/21	20.4	36.0	7.0	8	10.8
	74/10/01	74/12/16	30.0	50.0	10.0	2	28.3
	71/01/13	74/05/28	29.3	110.0	.00	32	24.8
	69/08/08	70/11/04	52.8	180.0	.00	12	56.7
	69/03/20	69/06/05	46.7	60.0	20.0	3	23.1
Kentucky River Lock 4	75/04/21	75/04/21	40.0			1	
Kentucky River Lock 2	75/01/07	75/10/08	6.0	10.0	.00	4	4.90
	73/04/17	74/10/11	19.5	43.0	.00	8	15.9

Table H-9
Continued

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
Eagle Creek at Glencoe	75/01/30	75/12/18	14.0	40.0	.00	9	11.5
	71/10/14	74/12/09	32.5	180.0	.00	32	37.4
STORET #01046	Iron, micrograms/liter, EPA Standard 300 u g/l						
Carr Fork near Sassafras	75/01/28	75/12/17	30.0	90.0	.00	9	30.4
	71/10/19	74/12/17	134.6	860.0	.00	28	222.8
North Fork Kentucky River at Hazard	74/04/16	74/04/16	10.0			1	
	65/01/07	74/04/16	65.8	450.0	.00	19	116.6
	64/12/01	74/04/16	76.7	450.0	.00	21	116.5
Red River near Pine Ridge	75/01/21	75/10/21	83.7	210.0	.00	8	65.2
	74/10/01	74/12/16	150.0	220.0	80.0	2	99.0
	71/01/13	74/05/28	147.0	440.0	.00	33	102.1
	69/08/08	70/11/04	183.3	410.0	90.0	12	100.7
	69/03/20	60/06/05	140.0	300.0	40.0	3	140.0
Kentucky River Lock 4	75/04/21	74/04/21	10.0			1	
Kentucky River Lock 2	75/01/07	75/10/08	5.0	20.0	.00	4	10.0
	73/04/17	74/10/11	38.7	90.0	.00	8	36.4
Eagle Creek at Glencoe	75/01/30	74/12/18	67.8	210.0	10.0	9	59.3
	71/10/14	74/12/09	95.6	280.0	10.0	32	66.2
STORET #01030	Chromium, micrograms/liter, EPA Stantard 300 u g/l						
North Fork Kentucky River at Hazard	75/03/20	75/06/17	.33	1.0	.00	3	.577
	74/04/16	74/10/03	.25	1.0	.00	4	.500
Red River near Hazel Green	75/07/08	75/08/19	.00	.00	.00	2	.00
Kentucky River Lock 4	75/01/22	75/04/21	1.3	4.0	.00	3	2.31
	74/03/11	74/09/30	1.9	10.0	.00	7	3.63
Kentucky River Lock 2	75/01/07	75/10/08	.50	1.0	.00	4	.577
	73/04/17	74/10/11	.286	1.0	.00	7	.488
Eagle Creek at Glencoe	75/06/06	75/06/06	1.0			1	
	74/03/16	74/12/09	.67	1.0	.00	6	.516

Table H-9
Continued

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
STORET #01049	Lead, micrograms/liter, Kentucky Standard 50 ug/l						
North Fork Kentucky River at Hazard	75/03/20	75/06/17	3.3	6.0	.00	3	3.06
	74/04/16	74/10/03	1.7	3.0	.00	3	1.53
	63/10/25	74/10/03	.556	3.0	.0	9	1.13
Red River near Hazel Green	75/07/08	75/08/19	5.0	7.0	3.0	2	2.83
Kentucky River Lock 4	75/01/22	75/04/21	4.0	8.0	1.0	3	3.61
	74/03/11	74/09/30	8.0	20.0	1.0	7	6.30
	62/11/12	74/09/30	3.3	20.0	0.	17	5.60
Kentucky River Lock 2	75/01/07	75/10/08	1.5	3.0	.00	4	1.73
	73/04/17	74/10/11	3.88	6.0	1.0	8	1.73
Eagle Creek at Glencoe	75/06/06	75/06/06	2.0			1	
	74/03/16	74/12/09	10.2	32.0	.00	6	12.6
STORET #01000	Arsenic, micrograms/liter, Kentucky Standard 50 ug/l						
North Fork Kentucky River at Hazard	75/03/20	75/06/17	.33	1.0	.00	3	.577
	74/04/16	74/10/03	.00	.00	.00	4	.000
	63/10/25	74/10/03	.56	3.0	.0	9	1.13
Red River near Hazel Green	75/07/08	75/08/19	.00	.00	.00	2	.00
	75/07/08	75/08/19	.00	.00	.00	2	.00
Kentucky River Lock 4	75/01/22	75/04/21	.33	1.0	.00	3	.577
	74/03/11	74/09/30	2.6	12.0	.00	7	4.39
	62/11/12	74/09/30	1.06	12.0	.0	17	3.00
Kentucky River Lock 2	75/01/07	75/10/08	.00	.00	.00	4	.00
	73/04/17	74/10/11	2.0	4.0	.00	8	1.60
Eagle Creek at Glencoe	74/06/06	75/06/06	1.0			1	
	74/03/16	74/12/09	1.2	2.0	.00	6	.753

Bacteriological Data

Total Coliform colonies per 100 ml. STORET #31503 Kentucky Standard 1,000/100 ml
Fecal Coliform colonies per 100 ml. STORET #31616

North Fork Kentucky River, Hazard						
Total Coliform	75/02/12	75/11/17	9160	31000	0	11
Fecal Coliform	75/02/12	75/08/13	770	1515	50	7

Table H-9
Bacteriological Continued

Station	Beg. Date	End Date	Mean	Max.	Min.	#OBS.	S
Kentucky River, Richmond WPI							
Total Coliform	75/01/21	75/12/23	409	1600	0	11	
	74/04/15	75/12/23	665	7000	0	22	
Fecal Coliform	75/09/10		70			1	
	74/09/24	75/09/10	28	70	0	4	
Kentucky River, Lexington WPI							
Total Coliform	75/01/21	75/12/23	476	1600	41	12	
	74/04/15	75/12/23	469	1600	20	22	
Fecal Coliform	75/07/22	75/12/18	16	30	0	3	
Dix River, Danville WPI							
Total Coliform	75/01/30	75/12/17	322	1600	0	12	
	74/04/15	75/12/17	267	1600	0	23	
Fecal Coliform	74/09/24	74/11/26	10	30	0	3	
Kentucky River, Lock #8							
Total Coliform	75/01/21	75/12/23	554	1600	4	11	
	74/04/15	75/12/23	546	2050	4	22	
Fecal Coliform	74/09/24	75/09/10	31	96	0	4	
Kentucky River, Frankfort WPI							
Total Coliform	75/07/31	75/12/17	2788	11000	115	6	
	74/04/30	75/12/17	25778	180000	115	14	
Fecal Coliform	75/08/26	75/12/17	1622	6700	200	5	